Chemical Age

ALBRIGHT BID FOR BOAKE ROBERTS
(page 197)

VOL. 83 No. 2116

30 January 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

For the transport of corrosive and sensitive liquids—

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M-W. 129

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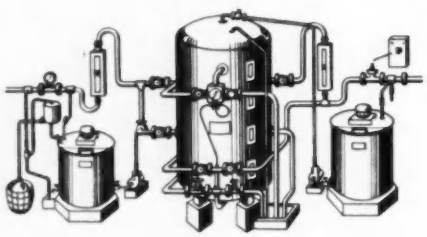

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International NU-SWIFT News

No. 1

HAVE YOU MET THESE PEOPLE?

1. The new 16-floor skyscraper in BASLE, Switzerland, built and occupied by GEIGY, the world-famous chemical concern, has been equipped with Nu-Swift extinguishers.

2. Old-fashioned chemical extinguishers in the SHELL-MEX Building, in the STRAND, LONDON, largest office building in the Commonwealth, have been superseded by reliable Nu-Swift equipment. Built in 1933, the 8,008,462 cubic feet of this giant edifice, which boasts 16 lifts, 6 oil-fired boilers and 22 miles of water pipes, are now protected by a total of 261 Nu-Swift extinguishers.

3. MONTEGO BAY AIRPORT on the North Coast of Jamaica, well known to sun-hungry socialites in U.S.A. and Britain, is now safeguarded by Nu-Swift. So is the exclusive TOWER ISLE HOTEL.

4. In gay VIENNA, 30 break-down vehicles belonging to the TOURING CLUB OF AUSTRIA (similar to the British A.A. service) have recently been equipped with Nu-Swift. Another 31 vehicles in GRAZ have been similarly protected.

5. In STOCKHOLM, beautiful capital of Sweden, a rush order for 1½ tons of extinguishers was recently executed by Nu-Swift sales concessionaires in 6 hours. The number of extinguishers required was 60. SKF, ASEA and STORA KOPPARBERGS BERGSLAGS A/B (the oldest industrial undertaking in the world), are among other industrial giants in fast-moving Sweden, who have standardised on reliable Nu-Swift Dry Powder Extinguishers.

6. If overtaken by the LAKE POLICE while speeding on the 20-mile long LAKE ZURICH, you will find their patrol boats equipped with Elland-made Nu-Swift Dry Powder Extinguishers, Model 1604. Ashore, this also applies to the police cars and garages of the City and Kanton of busy and prosperous ZURICH.

7. Direct rail connections link COPENHAGEN with Rome, Paris, Vienna, Venice, etc. THE DANISH STATE RAILWAYS have now equipped all international coaches starting from the up-to-date capital of Denmark, with Nu-Swift.

8. MR. HUGH DALTON, M.P., Chancellor of the Exchequer in the post-war Labour Government (1945-47), is the latest prominent politician to equip his home with Nu-Swift.

9. After exhaustive tests, extending over several years, the AUSTRALIAN ARMY have satisfied themselves that Nu-Swift Dry Power Extinguisher, Model 1604, meets their exacting requirements. The first orders have been placed.

10. More than 50% of all new NORWEGIAN vessels, mainly TANKERS, are protected by Nu-Swift.

11. Prince FAROUK, now a citizen of Monaco, but once King of EGYPT, one day when shooting in the desert near Cairo, saw his car ablaze. Fire was put out by a local Nu-Swift enthusiast. Result: The King had all his palaces and his yacht protected by Nu-Swift.

12. The underground aeroplane factories of SAAB (SVENSKA AEROPLANE A/B) Linköping, Sweden, are protected by Nu-Swift. So are the naval vessels in the ATOM-BOMB-PROOF UNDERGROUND HARBOUR near Stockholm, built into the mountain by the cautious Swedes.

13. In far-off FIJI, where cannibalism was rife within living memory, the recently constructed BROADCASTING STATION is protected against fire by Nu-Swift. So is the new AUTOMATIC TELEPHONE EXCHANGE.

14. An animated correspondence with G. BERNARD SHAW resulted in 1944 from an inquiry by the ever-alert but critical sage. Asked by Shaw why, in our letter of reply, no prices were quoted, a cheeky Nu-Swift clerk retorted that "We thought you wanted to protect your life, not your purse. Does price matter when your life is at stake?" G.B.S. rose to the bait by replying: "Please treat me as a prospective customer, not as a back-chat comedian".

HAVE YOU BEEN TO THESE PLACES?

15. SWISS FEDERAL RAILWAYS, one of the most efficient and modern railway systems in the world, have placed their first orders for Nu-Swift extinguishers.

16. Mr. W. J. SCOTT, Q.C., FIRE MARSHAL OF THE PROVINCE OF ONTARIO, during a recent lightning trip to Europe, as Dominion Government NATO delegate, included Elland in his itinerary. On his return, having also called at London, Paris, Rome and Madrid, he stated that the visit to Nu-Swift Factory remained the highlight of his European tour, and caused orders to be placed for sample and demonstration extinguishers for the new Ontario Fire Service College at GRAVENHURST, 80 miles from TORONTO.

17. Since THE SUDAN gained her independence, the authorities have decided to standardise on Nu-Swift. The first orders have arrived from Khartoum.

18. In KUWAIT, fabulously wealthy Arabian oil-well state on the Persian Gulf, police and army cars are now all protected by Nu-Swift.

19. The SOUTH AFRICAN ELECTRICITY SUPPLY COMMISSION have decided to place Nu-Swift Dry Powder Extinguisher, Model 1604, on all their breakdown and service vehicles. The first orders have been placed.

20. In NIGERIA, Africa, which is shortly expected to achieve independence, TRAINS AND HOSPITALS are equipped with Nu-Swift. Climate is hot and humid.

21. BRITISH EXPORTS of fire extinguishers are the highest in the world. Total value of NU-SWIFT exports is increasing continuously. Last year they amounted to NEARLY ONE-THIRD OF THE BRITISH TOTAL.

DISASTROUS FIRES CRIPPLE INDUSTRY,

—be ready with the best equipment available: NU-SWIFT.

NU-SWIFT LTD • ELLAND • YORKSHIRE • ENGLAND

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

Page		Page
160	A.P.V. Co. Ltd., The	—
154	Acalor (1948) Ltd.	—
85	Accrington Brick & Tile Co. Ltd., The	—
	Aeroz Ltd.	—
	African Pyrethrum Technical Information Centre Ltd.	—
117	Air Trainers Link Ltd.	—
131	Albany Engineering Co. Ltd., The	—
	Alchemy Ltd.	—
86	Alginate Industries Ltd.	—
100	Allen, Edgar, & Co. Ltd.	—
118	Allen, Frederick (Poplar) Ltd.	—
	Allen, George & Unwin Ltd.	—
	Alto Instruments (Gt. Britain) Ltd.	—
	Alumina Co. Ltd., The	—
	Andrew Air Conditioning, Ltd.	—
102	Anglo-Dal Ltd.	215
	Anthony, Mark, & Sons Ltd.	—
	Appleby & Ireland Ltd.	—
166	Armour Hess Chemicals Ltd.	—
G/Card	Ashmore, Benson, Pease & Co. Ltd.	—
	Associated Electrical Industries Ltd. Motor & Control Gear Division	187
	Associated Electrical Industries Ltd. Turbine-Generator Division	—
103	Associated Lead Mfrs. Ltd.	—
169	Automotive Products Ltd.	—
	B.T.R. Industries Ltd.	—
143	Baker Perkins Ltd.	—
	Baldwin Instrument Co.	—
159	Balfour, Henry, & Co. Ltd.	—
	Balfour Group of Companies, The	—
120	Barclay Kellett & Co. Ltd.	—
	Begg, Cousland & Co. Ltd.	—
	Bellingham & Stanley Ltd.	—
	Bennett, H. G., & Co. (Gloves) Ltd.	—
87	Bennett, Sons & Shears Ltd.	—
G/Card	Berk, F. W., & Co. Ltd.	—
104	Bivac Air Company Ltd.	—
132	Black, B., & Son Ltd.	—
2	Blackman, Keith, Ltd.	—
	Blaw, Knox, Chemical Engineering Co. Ltd.	190
197	Blundell & Crompton Ltd.	—
	Boby, William, & Co. Ltd.	—
	Borax & Chemicals Ltd.	—
84	Borax Consolidated Ltd.	—
	Borer Engineering Co. Ltd.	—
4	Boulton, William, Ltd.	—
97	Bourne Chemical Industries Ltd.	—
	Bowmans Chemicals Ltd.	—
119 & 147	Braby, Frederick, & Co. Ltd.	—
86	Bristol Piping Co. Ltd., The	—
	British Acheson Electrodes Ltd.	—
	British Carbo Norit Union Ltd.	—
	British Ceca Co. Ltd., The	—
	British Celanese Ltd.	192 & 193
	British Drug Houses Ltd., The	—
146	British Ermeto Corporation Ltd.	—
Spine	British Geon Ltd.	—
	British Industrial Solvents	—
220	British LaBour Pump Co. Ltd.	—
	British Lead Mills Ltd.	—
Spine	British Resin Products Ltd.	—
152	British Rototherm Co. Ltd., The	—
89	British Steam Specialties Ltd., The	—
	British Sulphur Corporation Ltd., The	—
134	British Tar Products Ltd.	—
	British Thomson-Houston Co. Ltd., The	—
231	British Titan Products Co. Ltd.	—
267	Broadbent, Thomas, & Sons Ltd.	—
137	Brotherhood, Peter, Ltd.	—
	Brough, E. A., & Co. Ltd.	—
101	Bryan Donkin Co. Ltd., The	—
132	Burnett & Rolfe Ltd.	—
162	Bush, W. J., & Co. Ltd.	—
	Buss Ltd.	—
88	Butterfield, W. P., Ltd.	—
	Butterworths Scientific Publications	—
126	Calder Vale Glassworks Ltd.	—
	Callow Rock Lime Co. Ltd., The	—
	Carless, Capel, & Leonard Ltd.	194
	Catterson-Smith, R. M., Ltd.	—
210	Causeway Reinforcement Ltd.	—
	Chemical Age Enquiries	215 & 216
178	Chemical Construction (G.B.) Ltd.	—
	Chemical & Insulating Co. Ltd., The	—
106	Chemical Workers' Union	—
	Chemicals & Feeds Ltd.	—
	Christy & Norris Ltd.	—
	Ciba (A.R.L.) Ltd.	—
110	Ciba Clayton Ltd.	—
	Ciech Ltd.	Cover iii
	Citenco Limited	—
	Clark Ltd.	—
	Classified Advertisements	216, 217 & 218
95	Clayton, Son & Co. Ltd.	—
142	Clydesdale Chemical Co. Ltd., The	—
	Cochran & Co. (Annan) Ltd.	—
	Cohen, George, Sons & Co. Ltd.	—
121	Cole, R. H., & Co. Ltd.	—
90	Collins Improved Firebars Ltd.	—
	Colt Ventilation Ltd.	—
133	Comet Pump & Eng. Co. Ltd., The	—
	Consolidated Zinc Corporation Ltd.	—
	Constantin Engineers Ltd.	—
	Constructors, John Brown, Ltd.	—
	Controlled Convection Drying Co.	—
	Cooke, Troughton & Simms Ltd.	—
	Crofts (Engineers) Ltd.	—
	Cromil & Piercy Ltd.	Cover ii
	Crosfield, Joseph, & Sons Ltd.	—
	Crow Carrying Co., Ltd., The	—
99	Cruickshank, R., Ltd.	—
214	Curran, Edward, Engineering Ltd.	—
171	Cyanamid of Great Britain Ltd.	—
88	Cyclops Engineering Co. Ltd., The	—
	Daglish, John, & Sons Ltd.	—
150	Danks of Netherton Ltd.	—
149	Davey & Moore Ltd.	—
173	Davey, Paxman & Co. Ltd.	—
	Dawson, McDonald & Dawson Ltd.	—
94	Derby Luminescents Ltd.	—
	Distillers Co. Ltd., The	—
175	Distillers Co. Ltd., The (Chemical Div.)	—
	Distillers Co. Ltd., The (Industrial Group)	—
163	Dorr-Oliver Co. Ltd.	—
139	Doulton Industrial Porcelains Ltd.	—
136	Dring & Fage Ltd.	—
183	Drummond Patents Ltd.	—
151	Dryden, T., Ltd.	—
96	E.C.D. Ltd.	—
	Electric Resistance Furnace Co.	—
	Electro-Chemical Engineering Co. Ltd.	—
	Electrothermal Engineering Ltd.	—
	Elga Products Ltd.	—
	Elliott, H. J., Ltd.	—
158	Elmatic	—
111	Engelhard Industries Ltd. (Baker Platinum Division)	—
G/Card	Erinoid Ltd.	—
	Evans, Joseph, & Sons (Wolverhampton) Ltd.	—
	Evershed & Vignoles Ltd.	—
90	Farnell Carbons Ltd.	—
	Fawcett, Preston & Co. Ltd.	—
124	Feltham, Walter H., & Son Ltd.	—
138	Ferris, J. & E., Ltd.	—
	Fertilizers & Chemicals Ltd.	—
	Fielden Electronics Ltd.	—
130	Film Cooling Towers (1925) Ltd.	—
	Flight Refuelling Ltd.	—
	Ford, T. B., Ltd.	—
93	Foxboro-Yoxall Ltd.	—
	Foyle, W. & G., Ltd.	—
	Freeman Taylor Machines Ltd.	—
198	Fullers Earth Union Ltd., The	—
	Gallenkamp, A., & Co. Ltd.	—
	Gas Council, The	—
	Girdleston Pumps Ltd.	—
	Glass Manufacturers' Federation	—
	Giusti, T., & Sons	—
134	Glebe Mines Ltd.	—
218	Goodyear Pumps Ltd.	—
107	Graviner Mfg. Co. Ltd.	—
109	Grazebrook, M. & W., Ltd.	—
122	Greeff, R. W., & Co. Ltd.	—
	Grubb Parsons, Sir Howard, & Co. Ltd.	—
138	Haller & Phillips Ltd.	—
124	Harris (Lostock Gralam) Ltd.	—
	Hathernware Ltd.	—
	Haworth, F. (A.R.C.), Ltd.	—
144	Heathway Machinery Co. Ltd.	—
	Herbert, Alfred, Ltd.	—
	Hilger & Watts Ltd.	—
183	Holland, B. A., Eng. Co. Ltd., The	—
	Hopkin & Williams Ltd.	—
	Humphreys & Glasgow Ltd.	—
6	Huntingdon, Herbelein & Co. Ltd.	—
	I.C.I. (Billingham)	—
	I.C.I. Catalysts	—
	I.C.I. Ltd. Heavy Organic Chemicals	—
	I.C.I. Metals Titanium D.	—
	I.C.I. Plastics—Darvic	—
	I.C.I. Plastics—Fluon	189
	I.C.I. Ltd. (Plastics Division), Corvic	—
	I.C.I. (Florube) Ltd.	—
	Industrial Descaling Tools Ltd.	—
	Infra Red Development Co. Ltd., The	—
127	International Furnace Equipment Co Ltd., The	—
	Isopad Ltd.	—
102	Jackson, J. G., & Crockatt Ltd.	—
125	Jenkins, Robert, & Co. Ltd.	—
	Jenkinson, W. G., Ltd.	—
3	Jobling, James A., & Co. Ltd.	—
	Johnson, Matthey, & Co. Ltd.	—

(Continued on page 188)

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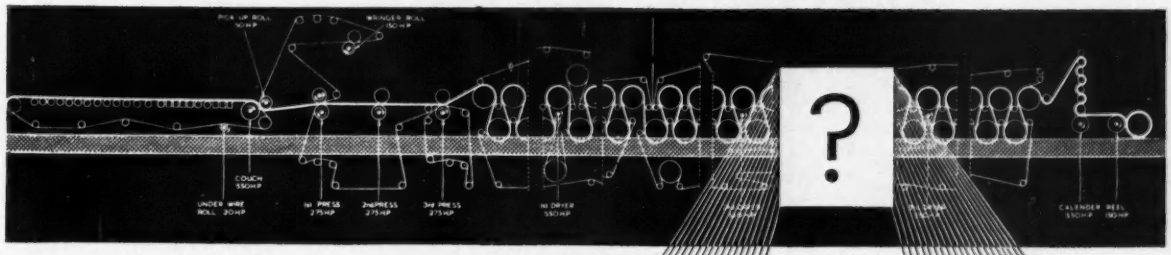

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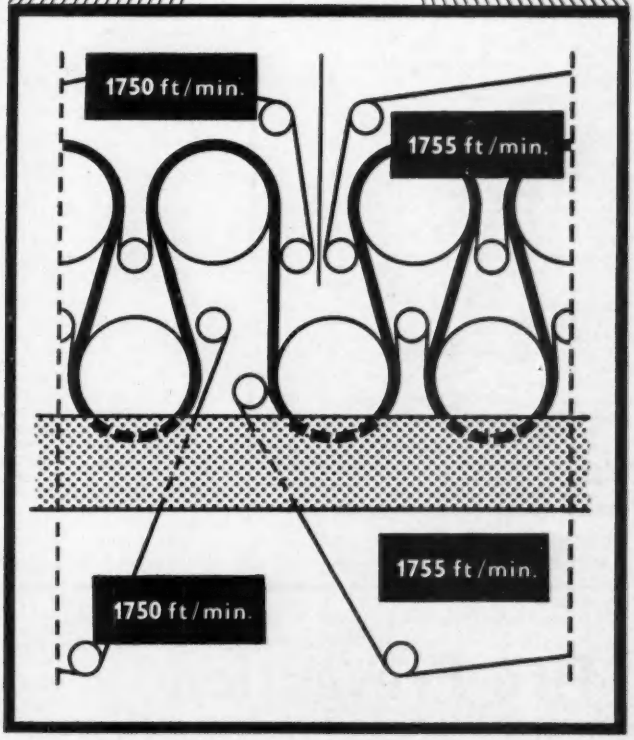

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INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

Page		Page
98	Johnsons of Hendon Ltd.	—
	Jones & Stevens Ltd.	—
108	K.D.G. Instruments Ltd.	—
148	K.W. Chemicals Ltd.	Cover ii
	Kaylene (Chemicals) Ltd.	—
	Kellie, Robert, & Sons Ltd.	—
	Kellogg International Corporation	—
110	Kernick & Son Ltd.	—
265	Kestner Evaporator & Engineering Co. Ltd	—
	Kestner Evaporator & Engineering Co. Ltd. (*Keebush*)	—
	Kestner (Industrial Safety) Ltd.	—
130	Kier, J. L., & Co. Ltd.	—
	King, G. W., Ltd.	—
208	Kingsley & Keith Ltd.	—
184	Kleen-e-ze Brush Co. Ltd., The	—
122	Laboratory Apparatus & Glass Blowing Co.	—
224	Lambeth & Co. (Liverpool) Ltd.	—
	Langley Alloys Ltd	—
112	Lankro Chemicals Ltd.	—
205	Laporte Chemicals Ltd.	—
114	Lavino (London) Ltd.	—
173	Leda Chemicals Ltd.	—
96	Leek Chemicals Ltd.	—
112	Leigh & Sons Metal Works Ltd.	—
	Lennig, Charles & Co. (Great Britain) Ltd.	—
	Lennox Foundry Co. Ltd.	—
129	Light, L., & Co. Ltd.	—
135	Lind, Peter, & Co. Ltd.	—
118	Liquid Solid Separations Ltd.	—
	Lloyd & Ross Ltd.	Cover iv
B/cover	London Aluminium Co. Ltd., The	—
142	London Sand Blast Decorative Glass Works Ltd., The	—
	Longman Green & Co. Ltd.	—
	Longworth Scientific Instruments Co.	—
92	Lord, John L., & Son	Cover iv
	Loughborough Glass Co. Ltd.	—
	McCarthy, T. W., & Son	186
	MacLellan, George, & Co. Ltd.	—
	Maine, B. Newton Ltd.	—
126	Manesty Machines Ltd.	—
177	Marchon Products Ltd.	—
	Marston Excelsior Ltd.	—
108	Matthews & Yates Ltd.	—
	May & Baker Ltd.	194
	Measuring & Scientific Equipment Ltd.	—
	Mervyn Instruments & Co. Ltd.	—
Front Cover	Metal Containers Ltd.	Front cover
	Metafiltration Co. Ltd.	—
G/Card	Metalock (Britain) Ltd.	—
126	Metcalf & Co.	—
	Metropolitan-Vickers Electrical Co. Ltd.	—
148	Middleton & Co. Ltd.	—
	Mirrlees Watson Co. Ltd., The	—
140	Mirvale Chemical Co. Ltd., The	—
	Mitchell, L. A., Ltd.	—
141	Mitchell Cotts Co. Ltd.	—
	Mond Nickel Co. Ltd., The	—
120	Monkton Motors Ltd.	—
	Monsanto Chemicals Ltd.	—
	Morgan Refractories Ltd.	—
	Moritz Chemical Engineering Co. Ltd.	—
	National Coal Board	—
	National Industrial Fuel Efficiency Service	—
82	Neckar Water Softener Co. Ltd.	Cover ii
115	Negretti & Zambra Ltd.	—
	Nitrate Corporation of Chile Ltd.	—
	Nordac Ltd.	191
	Nuovo Pignone	—
	Nu-Swift Ltd.	185
146	Odoni, Alfred A., & Co. Ltd.	—
G/Card	Oil & Colour Chemist' Association	—
136	Optical-Mechanical (Instruments) Ltd.	—
	P.G. Engineering Ltd.	—
	Palfrey, William, Ltd.	—
	Pan American World Airways	—
8	Paterson Engineering Co. Ltd., The	—
161	Peabody Ltd.	—
	Penrhyn Quarries Ltd.	—
194 & 232	Permutit Co. Ltd., The	—
G/Card	Petrocarbon Developments Ltd., The	—
	Petrochemicals Ltd.	—
	Plastic Constructions Ltd.	—
150	Plastic Filters Ltd.	—
154	Podmores (Engineers) Ltd.	—
206	Polypenco Ltd.	—
223	Pool, J. & F., Ltd.	—
	Pott, Cassels & Williamson Ltd.	—
	Potter, F. W., & Soar Ltd.	—
180	Powell Duffryn Carbon Products Ltd.	—
G/Card	Power-Gas Corporation Ltd., The	—
	Premier Colloid Mills Ltd.	—
	Preston, J., Ltd.	—
197	Prat-Daniel (Stanmore) Ltd.	—
128	Price Stuffield & Co. Ltd.	—
	Price's (Bromborough) Ltd.	—
	Prodorite Ltd.	—
190	Pye, W. G., & Co. Ltd.	—
	Pyrene Co. Ltd.	—
	Pyrene-Panorama Ltd.	—
162	Pyrometric Equipment Co. Ltd., The	—
	Q.V.F. Ltd.	—
	Quickfit & Quartz Ltd.	—
186	Reads Ltd.	—
140	Rediweld Ltd.	—
	Rheem Lysaght Ltd.	—
	Richardson Scale Co. Ltd.	—
	Richmond Welding Co. Ltd.	—
G/Card	Rose, Downs & Thompson Ltd.	—
153 & 188	Dr. Rosin Industrial Research Co. Ltd.	—
124	Rotometer Manufacturing Co. Ltd.	—
118	S.P.E. Company Ltd.	—
	Saint-Gobain	—
113	Sandiacre Screw Co. Ltd., The	—
	Saunders Valve Co. Ltd.	—
	Scientific Design Co. Inc.	—
	Scientific Instrument Manufacturers' Association of Great Britain Ltd.	—
	Sharples Process Engineers Ltd.	—
193	Shell Chemical Co. Ltd.	213
	Shell-Mex & B.P. Ltd.	—
	Shell Industrial Oils	—
	Shipping Studies Ltd.	—
91	Siebe, Gorman & Co. Ltd.	—
	Sifam Electrical Instrument Co. Ltd.	—
	Simon, Richard & Sons Ltd.	—
	Smith, Leonard (Engineers) Ltd.	—
	Sipon Products Ltd.	—
128	Southern Instruments Analytical Dept.	—
128	Spencer Chapman & Messel Ltd.	—
	Stabilag Co. Ltd., The	—
	Stanfield & Carver	—
266	Stanton Instruments Ltd.	—
	Staveley Iron & Chemical Co. Ltd.	—
92	Steel, J. M., & Co. Ltd.	—
	Stockdale Engineering Co. Ltd.	—
	Stonehouse Paper & Bag Mills	—
	Streamline Filters Ltd.	—
	Sturge, John & E. Ltd.	—
	Sutcliffe Speakman & Co. Ltd.	—
156	Synthite Ltd.	—
149	"T.P." Chemical Engineering Co. Ltd.	—
155	Taylor Rustless Fittings Co. Ltd., The	218
142	Taylor Stainless Metals Ltd.	—
152	Thermal Syndicate Ltd., The	—
	Thermo Plastics Ltd.	—
120	Titanium Metal & Alloys Ltd.	—
144	Towers, J. W., & Co. Ltd.	—
	Townson & Mercer Ltd.	—
	Turners Asbestos Cement Co. Ltd.	—
	Triangle Valve Co. Ltd.	—
210 & 224	Tylers of London Ltd.	—
	Unicone Co. Ltd., The	—
	Unifloc Ltd.	—
	Unilever Ltd.	—
	Union Carbide Ltd.	—
	United Coke & Chemicals Co. Ltd.	—
104	United Filters & Engineering Ltd.	—
G/Card	Universal-Matthey Products Ltd.	—
183	W.E.X. Traders Ltd.	—
	Walker, James, & Co. Ltd.	—
	Walker, P. M.	—
	Wallach Bros. Ltd.	—
105	Waller, George, & Son Ltd.	—
98	Wallis, Charles & Sons (Sacks) Ltd.	—
123	Ward, Thos. W., Ltd.	—
	Warren-Morrison Ltd.	—
152	Watson, Laidlow, & Co. Ltd.	—
	Wellington Tube Works Ltd.	—
116	Wells, A. C., & Co. Ltd.	—
220	Wengers Ltd.	—
	Whessoe Ltd.	—
	Whiffen & Sons Ltd.	—
184	Whitaker, B., & Sons Ltd.	—
	White, Child-Beney Ltd.	—
123	Widnes Foundry & Engineering Co. Ltd.	—
202	Wilcox, W. H., & Co. Ltd.	—
136	Wilkinson, James, & Son Ltd.	—
	Williams, G., Engineering Co.	—
94	Williams & James (Engineers) Ltd.	—
122	Wilson, Edward, & Son Ltd.	—
114	Wood, Harold, & Sons Ltd.	—
	Wood, A. R.	—
156	Worcester Royal Porcelain Co. Ltd., The	—
	Wynn (Valves) Ltd.	—
116	Yorkshire Tar Distillers Ltd.	—
	Young, A. S., & Co.	—
106	Zeal, G. H., Ltd.	—

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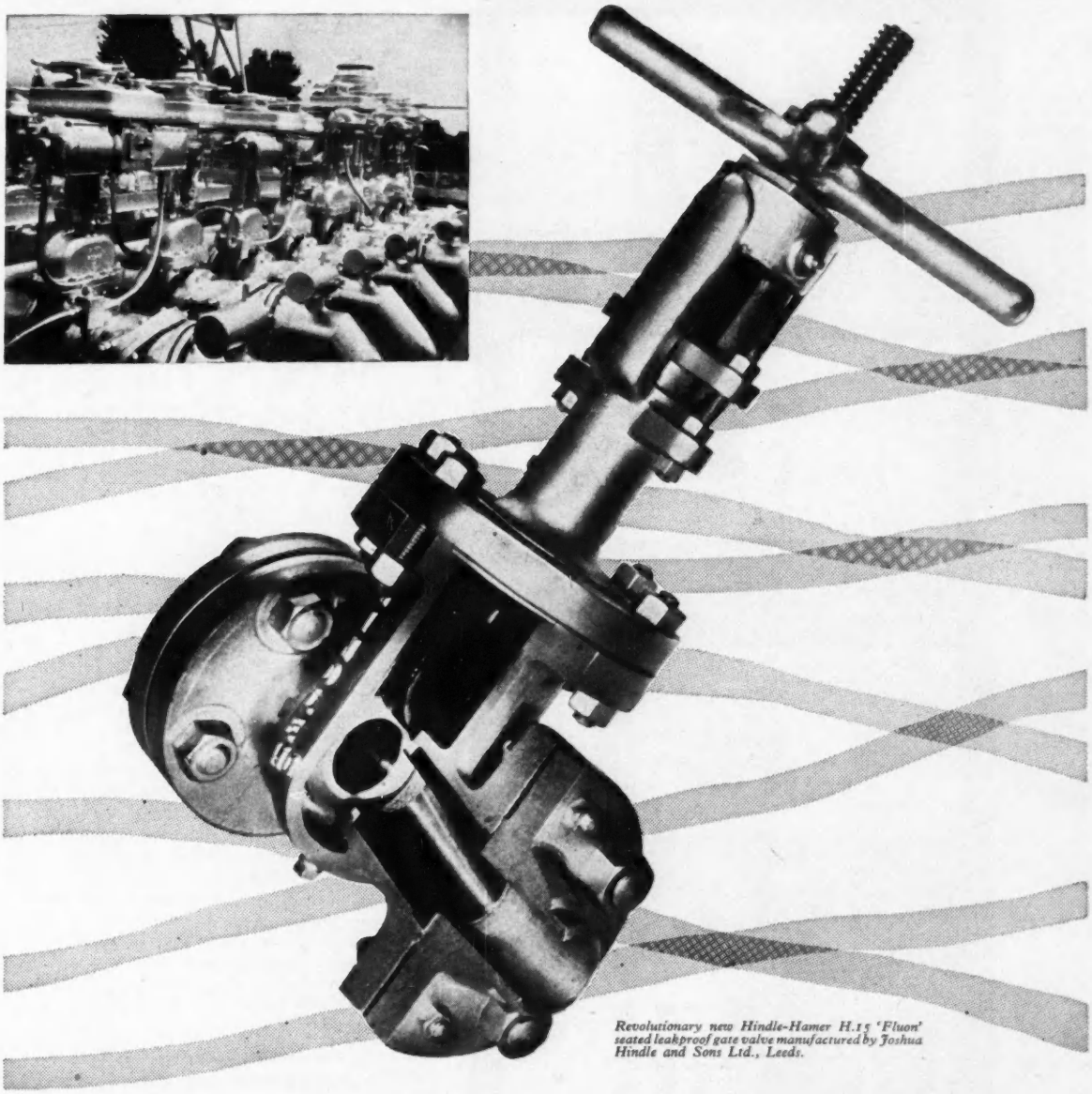

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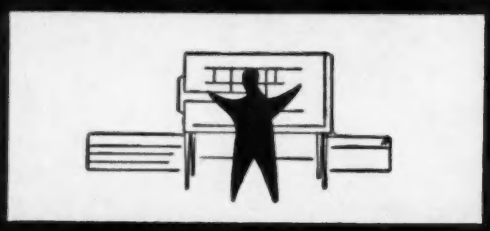

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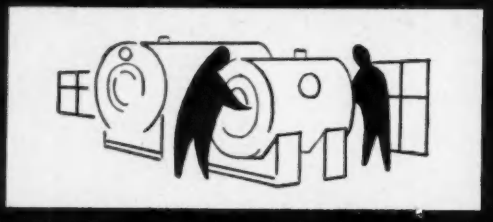

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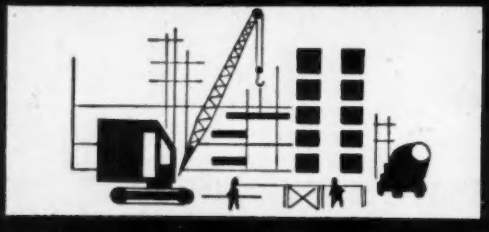

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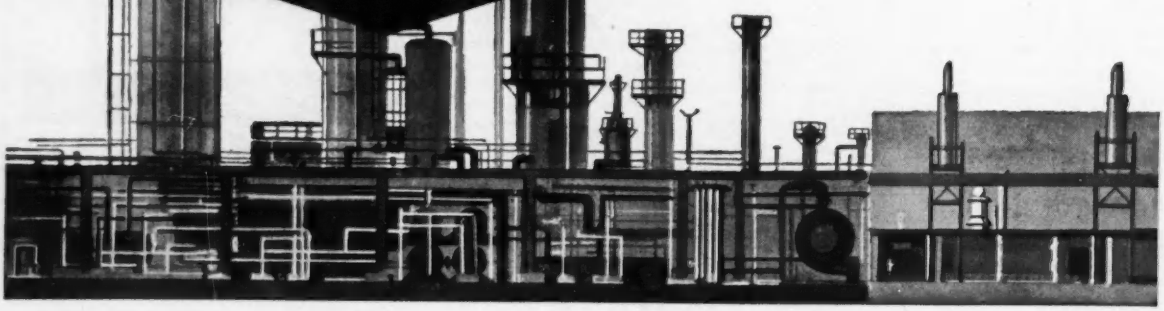

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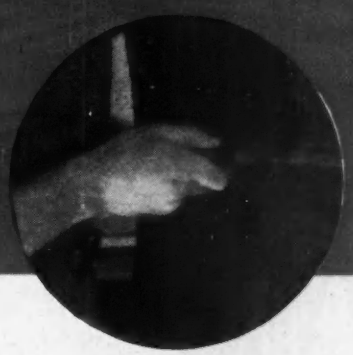

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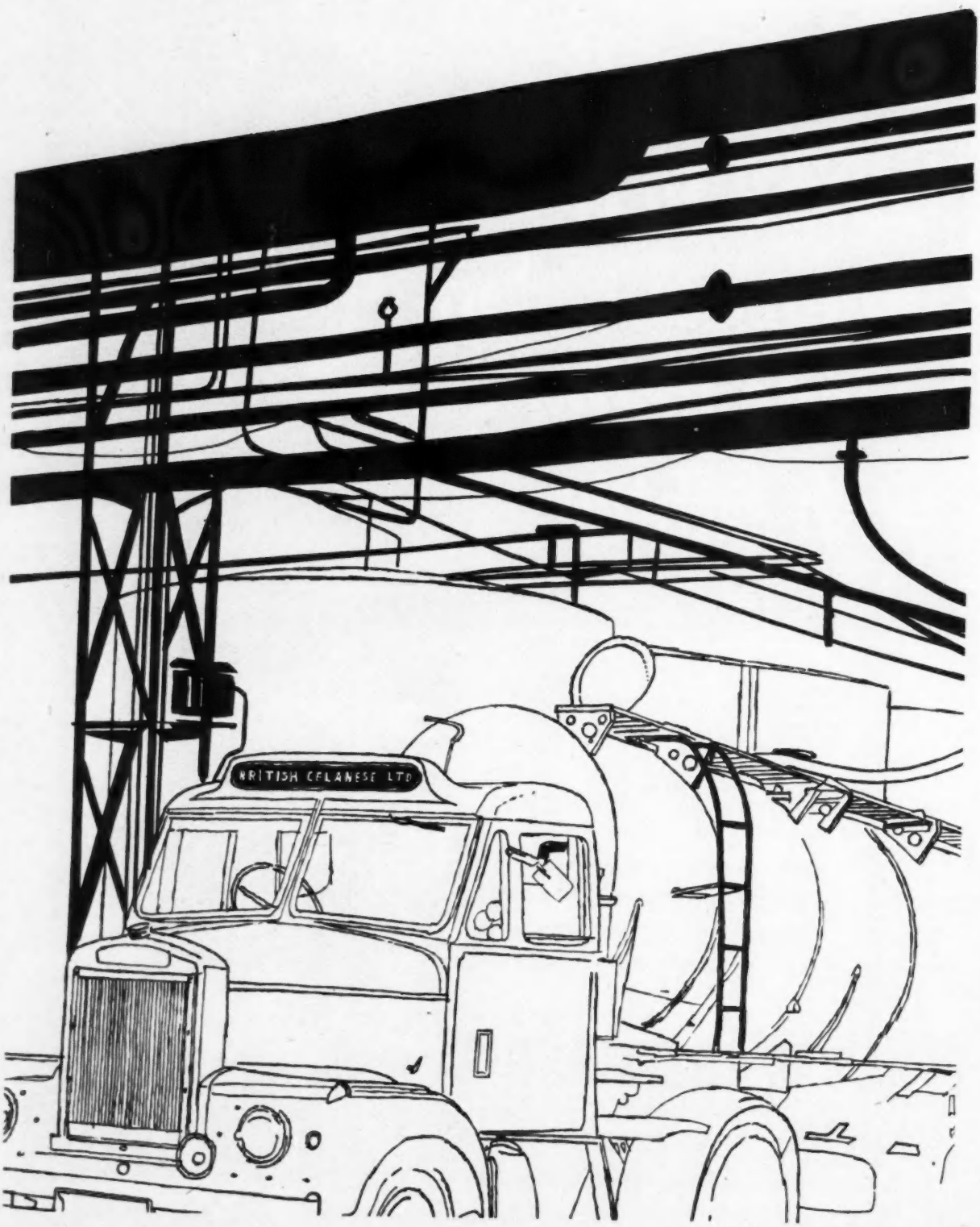

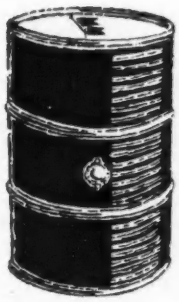

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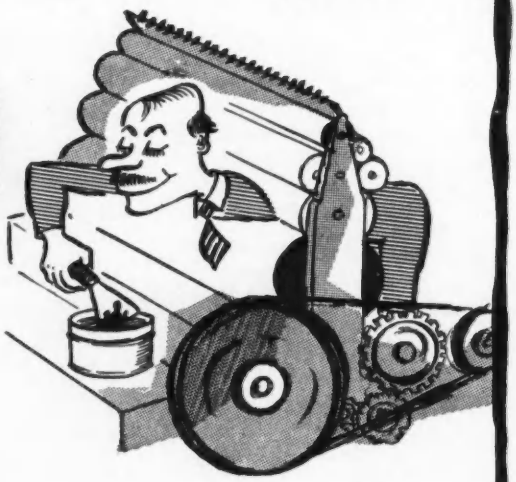

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IN THIS ISSUE

Albright-Boake Roberts Merger	197
Project News	197
Distillates	198
Montecatini Formaldehyde Process	199
C.S.-R.I.C. Joint Annual Meeting	200
New Dutch Prilling Technique	201
O.E.E.C. Chemical Survey	203
U.K. Import-Export Trade	204
Equipment News	205
Commercial News	208
Market Reports	208
Overseas News	209
People in the News	211
Diary Dates	211
British Chemical Prices	212
Trade Notes	214
New Patents	215

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C

CHEMICAL AGE

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TRADING IN EUROPE

CLOSER trade and economic co-operation in Europe began in 1947 with the rebuilding of war-disturbed economies. This was started by means of the Marshall Plan and the practical work of the Organisation for European Economic Co-operation (O.E.E.C.). Through O.E.E.C. and the European Payments Union (E.P.U.), great progress has been made in overthrowing quota restrictions and barriers to payments between its members. Co-operation in other important fields has also been secured.

One thing that O.E.E.C. has not dealt with effectively has been tariff barriers. Its members thought this should be tackled consistently with the provisions of the General Agreement on Tariffs and Trade (G.A.T.T.). To abolish tariffs meant the formation either of a customs union or free trade area (F.T.A.), the former involving a common external tariff, while with the latter each country would maintain its individual tariff structure in relation to third countries.

The six signatories of the Rome Treaty look for a closely-allied European Economic Community (E.E.C.). The U.K. and other members of the O.E.E.C. have not felt able to carry economic co-operation to such an extent, while within the E.E.C. it was considered that to take part in a multilateral agreement dealing essentially with the freezing of trade could be hazardous for the Six's other objectives. Hence the collapse of the negotiations for the formation of a 17-country F.T.A. within the O.E.E.C. Seven countries not members of E.E.C. decided to continue with their aims of removing trade restrictions in a separate group. Their desire is to keep up the search for economic co-operation on a European scale, to bridge the gap between them, the E.E.C. and other members of the O.E.E.C. and to secure the advantages of tariff reductions and quota abolition among themselves, consistent with the movement towards free world trade.

Benefits of free trade between the Seven are clear, although the U.K. chemical industry would not gain as much as the chemical industries of Britain's F.T.A. partners. With only half the population of the E.E.C. group, the F.T.A. countries have a gross national product nearly two-thirds as big. Important from the U.K. view is the fact that F.T.A. countries have exceptionally high imports in relation to their gross national products. For chemicals this was over £200 million in 1958; and the U.K. share was some £25 million with Sweden the largest market, followed by Denmark and Norway.

Today a tenth of U.K. exports go to F.T.A. associates producing an eighth of their total imports. These imports which have been expanding steadily could grow even faster as free trade widens the national product of the countries concerned. Hence the F.T.A. is seen as providing trade advantages for all the members which would contribute towards the further freeing of trade among O.E.E.C. countries and at the same time providing some expansion of world trade.

Tariff reductions would give the exporting industries opportunities to expand their markets, while increasing productivity in the area would encourage interchange of goods between the member-countries. Looked for is a single market in Europe in which all O.E.E.C. countries can trade with the maximum of freedom.

The Seven hope that their body and the Six can come together, but the Council of Europe debate on European economic relations last week in Strasbourg provided further evidence of growing animosity between the Six and the Seven. The Swedish Trade Minister has called for a European solution to the European problem, while Professor Hallstein, chairman of the European Commission, has said that an examination of particular problems and their possible solution is all that can be expected in the forseeable future. The economic committee backed by representatives of the Seven has recommended Governments to 'reach agreements as soon as possible . . . on a European economic association.' The political committee, dominated by the Six, has recommended 'machinery—to hear complaints—to promote compensatory tariff and adjustments and to prepare the way towards a unified commercial policy.'

Professor Hallstein has explicitly refused to give any undertakings about the possibility of excusing the Benelux countries from the obligation to increase their external tariffs under the Rome Treaty. Mr. Selwyn Lloyd has refused to endorse the Swedish Trade Minister's suggestion of a degree of harmonisation in the external tariffs of the Seven. While he felt there was a new determination to try to reach agreement, he considered that changes in position were necessary on all sides.

Observers, familiar with the handling of negotiations of 1958, have indicated that at the moment, in the absence of a general solution which now looks more unattainable than ever, the question is whether the Seven can hold together long enough to see the Common Market fall apart.

O.E.E.C. PARIS MEETING

At the Paris meetings on O.E.E.C. and the F.T.A. on 14 January, several resolutions previously adopted were approved. One of these recognised that there were problems of commercial policy of particular concern to 20 governments who are members of, or associated with, O.E.E.C. Taking note of the existence of the E.E.C. and of the convention for an F.T.A., and considering the need to examine as a matter of priority, the relationship between the E.E.C. and the F.T.A. with due regard to commercial interests of third countries and principles and obligations of the G.A.T.T., it has been decided to propose to the 20 governments that they constitute themselves, together with the E.E.C. as a committee with power to carry out the following:

Establish one or more informal working groups for consideration of these problems without infringing the competence of the existing international institutions such as G.A.T.T. or O.E.E.C.; and to invite G.A.T.T.'s executive secretary to participate in these discussions. Of the greatest immediate importance is this last decision that 18 European members of O.E.E.C., with the U.S., Canada and the Common Market Commission and the executive secretary of G.A.T.T. are to look into the relationship between the Six and the Seven as a matter of priority.

The importance of O.E.E.C. to the Seven and hence to the U.K. lies in its provision of a European organisation of which the U.K. is part. O.E.E.C. also stands to remind everyone that Europe is one natural trading area. But the U.S. Government has actively disliked the idea of this wide trading area on the grounds of discrimination against U.S. exports. If Europe remains divided the U.S. and German exporter are on an equal footing with both having to face the same U.K. tariff. If there is a link between the Six and the Seven then the German manufacturer with no duty to pay has an advantage over U.S. competitors.

In New York last week, Mr. R. Maudling, president of the Board of Trade, argued that the six Common Market countries and the Outer Seven forming a single market would not be disadvantageous to the U.S. He pointed out three ways in which U.S. overseas earnings could gain from a single European market. First, such a market could be expected to grow more rapidly than the Six and the Seven could by themselves; and a faster rate of growth would mean more imports from the U.S. Secondly, income from overseas investments is playing an increasingly important part in the U.S. balance of payments, and the larger the area of a common market, the quicker would U.S. businessmen be prepared to increase their investments there. Thirdly, Mr. Maudling suggested that in the long run it was more likely that the General Council of European Tariffs against U.S. goods would be brought down if there was a European agreement.

Mr. Maudling's first suggestion is seen as cutting both ways, but the other two propositions are straightforward. The question is, however, whether the gains that the B.o.T. President envisages would outweigh the losses that the U.S. administration foresees.

A SINGLE MARKET?

In his U.S. speech, Mr. Maudling indicated that the U.K. solution is based on the realisation that there is very little hope for an all-European F.T.A.—namely for 'a single market.' This could mean an F.T.A. or a customs union or a combination of the two. This change of heart on the part of the U.K. could remove the block which wrecked the 1958 O.E.E.C. negotiations when Britain was insistant that there could be no harmonisation of U.K. external tariffs with the other European countries.

The problem of a complete customs union is the tariffs of Switzerland and Sweden—co-members of the Seven—where the majority are lower than the U.K. or those planned for E.E.C. of the Six. To overcome this difficulty the U.K. and the Six could reduce their tariffs; Britain has been reluctant to do this as the tariffs on foreign raw materials and semi manufactures are generally lower than those planned for the Six, but are important as a preferential device for the Commonwealth countries. U.K. tariffs on finished goods are generally higher than those planned by the Six. Reduction to the Swiss and Swedish tariff levels, however, would have the advantage of being attractive to the U.S. and would also offset the harmful effects on U.S. exports of an all-European trading arrangement. It would also seem fair to the U.S., whose overall external tariff averages only about two-thirds of the levels of the U.K. or those planned by the Six.

It has been suggested that the aim should be a North Atlantic Community in which European members had no tariffs against one another (with perhaps some exceptions) and a low and reasonably closely unified tariff against countries outside Europe, in which the U.S. shares the low tariffs with Europe, but is not included in the European customs union and so pays low tariffs on her exports to Europe and imposes a similarly low tariff on imports from Europe.

The major difficulty in the proposals for tariff harmonisation is Commonwealth Preference. The U.K. and the Commonwealth countries might negotiate, however, for tariff-free quotas or the Commonwealth might enter the European negotiations. This plan would require approval by G.A.T.T. and would probably be opposed by the U.S.

That the U.K. Government is having a change of heart is surely reflected in Mr. Maudling's New York speech. The only major barrier to entry of the U.K. into the Six has been the question of harmonisation of the tariff with that of the Six and now this looks like being removed.

For details of U.K. chemical exports and imports in 1958 and 1959 see page 204.

Project News

Humglas Build Canadian Plant for Phenol

● CONSTRUCTION was started recently by Humphreys and Glasgow (Canada) Ltd., on a 20% extension to the phenol and acetone units at B.A.-Shawinigan's Montreal petrochemical plant. Jointly owned by Shawinigan Chemicals and British American Oil, the company produces synthetic phenol and acetone via the D.C.L. cumene process, with other derivatives of the two products. Process design work began in November and the new plant is scheduled to be in operation by 1 May 1960.

The present contract involves additions and modifications to the existing process and service units including foundations, structures, piping, instrumentation and other items making up a turnkey project.

Humphreys and Glasgow (Canada) who have co-operated several times in recent years with B.A.-Shawinigan over engineering services, are an associate of Humphreys and Glasgow Ltd., London, who are established in eight countries.

● FIRST production unit of the nitrogen plant erected by a Franco-German consortium on the site of the old Aswan dam in the United Arab Republic is to come on stream on 1 March. Second and third stages of the plant, which has an annual capacity of 380,000 tonnes, are planned to be brought into operation on 1 June and 1 October respectively. A further stage which will raise capacity to a total of 500,000 tonnes a year is planned to follow the main erection project. Firms concerned in the project are Compagnie Industrielle de Travaux, Paris, Dr. Friedrich Uhde, Dortmund, and Badische Anilin- und Soda-Fabrik AG, Ludwigshafen-on-Rhine.

Uhde are also engaged in a Franco-Dutch-German undertaking in the building of a nitrogen plant in Portugal and in other similar schemes.

Shorter Working Week With No Pay Loss

Details have now been settled by the Chemical and Allied Industries Joint Council of an agreement under which about 60,000 manual workers in the chemical industry are to have their working week reduced from 44 to 42 hours without loss of pay. The new agreement is effective from 29 February.

This agreement follows the decision of Imperial Chemical Industries Ltd. to reduce their working week from 44 to 42 hours without loss of pay, which was announced at the end of October (see "Chemical Age," 7 November, p. 644).

Return to Work at Marchon

The unofficial strike at Marchont Products chemical factory in Cumberland has been ended pending wage negotiations. The walk-out affected some 235 employees at the plant.

Albright's Proposed £4 Million Merger with Boake, Roberts

RECENT rumours that Albright and Wilson Ltd. were likely to bid for the shares of A. Boake, Roberts and Co. (Holding) Ltd. were confirmed on Monday when the boards of both companies jointly stated that they had reached agreement with a view to a merger. This will be effected by an offer of Albright and Wilson shares on the basis of one ordinary stock unit of 5s plus 2s in cash for each 5s ordinary stock unit of Boake, Roberts, and one 5% cumulative preference share of £1 of A. and W. plus 1s in cash for each 5% cumulative £1 preference share of Boake, Roberts.

The terms put a value of some £3.8 million on the Boake, Roberts equity but the cash outlay will amount to only £265,000. Boake, Roberts manufacture aromatic chemicals and plasticisers and have subsidiaries in Australia, South Africa and Canada. Albright and Wilson, with subsidiaries in Canada, Australia and Italy, produce phosphoric acid and derivatives, plasticisers, silicones (through Midland Silicones Ltd.), detergent chemicals and sulphuric acid (through Marchon Products).

If the merger is carried through, the directors of Boake, Roberts, propose to declare a second interim dividend of 9½%, less tax, for the year ending 31 March, in place of a final dividend. This dividend will be paid during April 1960 to the present shareholders.

A. and W. directors expect to declare a second interim, to be final, of 13¼%, less tax, in respect of 1959. Ordinary shareholders of Boake, Roberts will not participate in this dividend. It will make a total equivalent to 18.3% on present capital, against an equivalent of 13.6%.

Formal offers to Boake, Roberts shareholders will be posted early next week by Philip Hill, Higginson, Erlangers Ltd. (See 'Distillates', p. 198.)

I.S.R. Expanding Synthetic Rubber Capacity at Hythe

ANNUAL capacity of International Synthetic Rubber Co.'s Hythe plant will be expanded from 70,000 to 90,000 tons of solid styrene/butadiene rubbers. The company states that the expansion gives a good indication of the swing to synthetic rubber taking place in the U.K. and overseas. U.K. consumption of synthetic rubber, which was 45,000 tons in 1958, is now running at an annual rate of 60,000 tons.

The I.S.R. plant is the only one in the U.K., and now supplies most of U.K. consumption of synthetic rubber and also exports the material to Australia, South Africa, Europe and other markets.

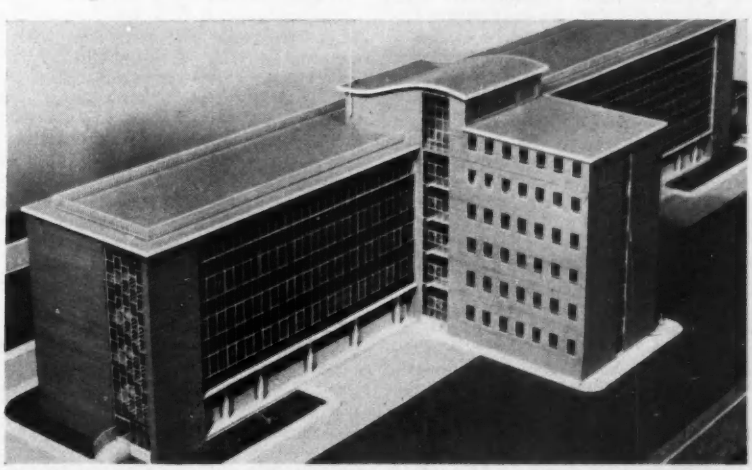
The expansion of I.S.R.'s capacity will not involve any additional capital expenditure. It will be achieved by a general speeding up of operations.

Apart from the expansion to 90,000 tons capacity for solid synthetic rubber, construction is now in progress of a plant to make 7,000 tons a year of synthetic rubber latex.

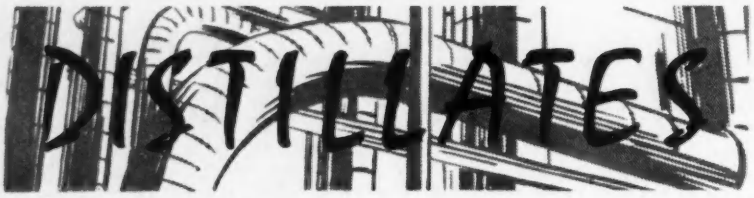
I.C.I. Sell Polyester Fibre Rights to Czechs

Right to use their Terylene process and to market the polyester fibre has been sold to the Czech National Silon Enterprise, Luznice, and involves payment to I.C.I. of some £220,000 over the first half of this year.

Pfizer Build New Kent Office Block



Artist's impression of the £500,000 office block being erected at Richborough, Kent, for Pfizer Ltd. The block will have a frontage of 260 ft., with provision for extensions. It is due for completion "later this year"



★ PERSISTANT rumours that the recent rise in A. Boake, Roberts and Co. (Holding) shares was a prelude to a take-over bid and that the bidder was most likely to be Albright and Wilson, which were referred to in *The Times* last Saturday, were confirmed on Monday. In a joint announcement, see p. 197, the two companies state they have reached agreement on a merger.

On the basis of current prices, the offer is worth nearly £4 million and would create a group with a market capitalisation of some £45 million. Albright and Wilson must have spent at least the same amount last year with their large-scale developments in Canada; a further project is planned for their Canadian subsidiary, Electric Reduction Co. Other investments, on a smaller scale, have been made at the A. and W. Oldbury Works, extensions to the sulphuric acid capacity of the U.K. subsidiary, Marchon Products and now Marchon's Italian company (see p. 200).

I was interested to note that Mr. R. E. Huffam, appointed a vice-chairman of Boake, Roberts earlier this month, is also a director of E. Griffiths Hughes (Proprietaries)—owners of British Schering and other companies—who as I stated last week have received a take-over bid from Aspro-Nicholas. Hughes recommend acceptance of this offer (see p. 208) and if it is in fact accepted, Mr. Huffam, it is planned, would join the Aspro-Nicholas board. He joined the boards of both Boake, Roberts and Griffiths Hughes last spring after retiring as a director of Unilever.

★ A NEW drug based on wartime mustard gas is giving some success in the treatment of lung cancer, report Drs. G. D. Jack, L. Doyle and M. M. Palejwalla in last week's *Lancet*. The new drug, Tretamine (2:4:6-triethyleneimino-s-triazine, triethylene melamine [T.E.M.]) has been used at Baguley Hospital, Wythenshawe, where of 43 cases treated 30 showed improvement. In 10, tumour growth was halted and reduced; in four cases a month's treatment had led to complete shrinkage of the lung tumours and the chest had returned to normal.

Although their findings are 'highly experimental,' the three doctors say that the results of the four cases in which the tumours shrank compelled them to make a preliminary report. They urge that Tretamine should be used in cases that are too bad for surgery.

Members of the nitrogen-mustard range of compounds have been used for some years to treat cancers and leukaemia.

First use of Tretamine in the control of clinical malignancy followed its release in 1951 for research purposes by Imperial Chemical Industries Ltd. as a result of observations on the inhibitory action of this and related compounds on the growth of experimental tumours.

★ THE £6 million modernisation and development scheme now in hand at the Manchester works of the Clayton Aniline Co. Ltd., and due for completion in 1964-65, is changing the face of the 54-acre site. Buildings of the most modern design with a spacious layout involving wide roads, pavements and grass verges are gradually transforming the heart of a dense industrial area and will on completion be one of the world's most modern dyestuffs works.

The reorganised works will incorporate highly efficient methods of production which should enable the company to maintain low manufacturing costs to meet the stiffer competition in dyestuffs that is expected with the probable repeal of the Dyestuffs (Import Regulation) Acts of 1920 and 1934 when the Outer Seven tariff changes are implemented.

Although West Germany's dyestuffs industry will be in the Common Market bloc and will, therefore, come up against the Outer Seven's external tariff wall. Switzerland, perhaps the world's' most important dyestuffs centre, is a member of the European Free Trade Association.

★ DISTINCTION of Head Wrightson Iron and Steel Works Engineering to gain the first British orders for L.D. and Kaldo converters for oxygen steelmaking processes was mentioned briefly last week ('Project News', p. 161). The new steel plant of Consett Iron will be the world's first to use both the L.D. and Kaldo processes; it will include two 100 ton L.D. units and two 100 ton Kaldo units.

The L.D. process is particularly suitable for producing steels in the low carbon range, while the characteristics of the Kaldo process enable a wide variety of analyses to be produced. Head Wrightson, who have been actively engaged in research and development for oxygen steelmaking processes and the allied problems of gas cleaning for some time, are associated with Pintsch Bamag, AG., Cologne, on oxygen steelmaking plant and with Research Cottrell Inc., U.S., on fume cleaning. Through these arrangements they have access to the experience of both companies.

Tonnage oxygen has helped overcome the high residual nitrogen in finished steel which was the main drawback of the basic Bessemer process, and now accounts for almost half the total usage of oxygen. With the rise in steel output since the end of September—a 20% rise in output to 44 million tons this year is forecast—oxygen sales should run at a much higher level.

★ IT IS as ridiculous to say that a slimming drug like Preludin should be banned from manufacture as it is to call for a halt to the use of chemicals in agriculture. Some of the products of the pharmaceutical industry, like some of those of the pesticides manufacturers are capable of causing hazards, but only if they are improperly used.

Recent outbursts against Preludin have verged on the hysterical. The makers, Pfizer of Folkestone, have produced a most effective treatment for slimming, but like other drugs, notably the barbiturates, it is prone to misuse. The remedy lies with the Health Ministry which should, as both Pfizer's and the Pharmaceutical Society have urged, restrict sale to doctors' prescriptions only.

Most pharmaceutical manufacturers would welcome such a step for drugs which affect the central nervous system and it is time that the Ministry acted. An expert committee now in the process of reporting to the Minister may, perhaps, have the desired effect.

★ PLANS for the erection of an oil refinery in South Germany have been under consideration for some time and it was strongly rumoured that the Italian E.N.I. concern was likely to get the go-ahead. Now, however, the Bavarian Ministry of Trade has issued a denial that it was planning to give any preferential treatment to E.N.I.

A new refinery is certainly projected at Karlsruhe, end of the Sahara oil pipeline, at Regensburg or at Munich. Esso AG, Hamburg, are understood to have plans in hand for a refinery in South Germany.

In the north, Reichhold Chemie AG, Hamburg, have signed a 'primary agreement' with the German oil company Deutsche Erdöl AG, also of Hamburg, providing for the joint production of petrochemicals. The two companies plan to set up a joint subsidiary, probably on a 50-50 basis, which will operate a petrochemical plant in the North Sea port of Brunsbuttelkoog. The new plant is to be brought into operation in 1961 and will be fed with starting products by pipeline from the nearby Deutsche Erdöl refinery at Heide.

★ NEXT major step in the U.K. petrochemicals sector, I understand, is likely to be the production of polyisoprene, not at present made in this country. Two British companies with existing petrochemical facilities are said to be actively interested; the first plant for polyisoprene is planned for a northern site.

Alembic

New Montecatini-Natta Process for Formaldehyde Gives High Yields and Prolongs Catalyst Life

PRODUCTION of formaldehyde on a large scale via the catalytic oxidation of methanol on metal oxides, is reported by Montecatini. The new process, already in use at the company's Castellanza plant, is stated to be responsible for an annual production of 100,000 tonnes of 37% formaldehyde solution (Drs. G. Greco and U. Soldano, *Chemie-Ingenieur-Technik*, 1959, December issue).

The process, developed in its fundamentals by Professors E. Natta and M. Baccaredda in the laboratories of the Milan Technical College, is based on the Adkins-Peterson (**1**) process of direct oxidation of methanol on metal oxide catalysts with a surplus of air, without simultaneous dehydration. Two patents have been brought out in connection with the Montecatini process, one dealing with certain particular aspects of the method (**2**), the other with the direct production of urea-formaldehyde concentrates from the gaseous reaction products (**3**).

Oxidation-Dehydration

In contrast to the process in which combined oxidation and dehydration of methanol is carried out with *too little* air over metallic, mainly silver, catalysts (**4, 5**) the Montecatini process takes the following form. An air-methanol mixture, with a methanol concentration below the lower explosive level (<6.7 to 8 vol.—%), is directed over a metal-oxides catalyst contact at the relatively low temperature of between 300° and 400°C. This catalyst serves almost exclusively for the oxidation of the methanol and produces a very high yield—over 90%. Small quantities of carbon monoxide and carbon dioxide occur as by-products.

As in the oxidation-dehydration process, gaseous reaction products are washed in a water counter-current; no rectification is needed as in the other process, however, as practically methanol-free formaldehyde solutions are obtained.

Under similar conditions, the metallic catalysts used by Montecatini last much longer than the silver catalysts of the oxidation-dehydration process—for the replacement of which the 85-90% yield plant has to cease operation comparatively often. With a lifetime of 18 months in continuous service, the Montecatini catalysts cause no such hold-ups. Apart from the advantages named—of longer catalyst life, higher yield and direct production of almost methanol-free formaldehyde solution which cuts out the need for rectification—the improvement gained by using the Montecatini process is enhanced by its higher reaction heat and better heat recovery.

One disadvantage of the new process is the extra current consumption of the direct-oxidation process's gas treatment. Further advantages of the Montecatini system more than make up for this, however, together with the main points in its favour. These further advantages are the simple and cheaper absorption equipment of the direct-oxidation plant and the reduced risk of explosion.

In the absorption stage of the Montecatini process, carried out in a single multiple-stage tower, the gaseous reaction products are absorbed by counter-flowing water. The result is a direct formation of a concentrated formaldehyde solution, the final product. The same absorption tower can be used for the production of urea-formaldehyde concentrates, in which case pre-heated concentrated urea solution is fed to the tower, suitable adjustments being made to the circulating gases and the pH-value of the solution. Concentrates of an 85-90% solid content are thus obtainable.

Completely automated, the Castellanza plant works with a catalyst specially developed by Natta and Baccaredda and produced by Montecatini's A. Donegani Research Institute. The multivalent metal oxides out of which the catalyst is prepared guarantee an extraordinarily high mechanical solidity, and only one kilogramme of it is needed for specific production of 20 tonnes of 37 weight-percent formaldehyde solution.

Analysis of the Montecatini's reaction product shows (in weight-per-cent) 37% of formaldehyde, 1% of methanol, 0.01% of formic acid, 0.5 .10⁴% iron and the remainder water.

The first production unit, with an annual capacity of 11,000 tonnes, was built by Montecatini at Castellanza. Then followed, in 1956 and 1958, after the complete success of the first installation, two further units, each with an annual capacity of 25,000 tonnes—also at Castellanza. A further unit—this time capable of producing 40,000 tonnes annually, bringing total output to above the 100,000-tonne mark, is at present being built there. Three further plants using the same process are to be set up at Renory in Belgium, at São Paulo in Brazil and in Roumania. The Belgian plant, with a daily production of 60 tonnes of 42% solution, will be operated by the Société Belge de l'Azote et des Produits Chimiques du Marly, the Brazilian plant —with 70 tonnes of 36% solution daily—by Quimica Industrial Medicinalis, and the 80 tonnes daily Roumanian plant, which will also produce 36% solution, by the country's Ministry for the Chemical and Petrochemical Industry.

Material used per tonne of 37% solution at one of the 25,000-annual-tonne Italian plants averages 435 kilogramme of 99.9% methanol, 0.05 kilogramme of catalyst and 0.3 kilogramme of mineral oil (for reaction-boiler thermostat).

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Nytril Fibre Rights Bought by Celanese Corporation From B. F. Goodrich

PATENTS, know-how, trademark and world rights to make and sell Darvan nytril fibre have been bought by Celanese Corporation of America from B. F. Goodrich. With this latest acquisition, Celanese have diversified themselves still further. The company already has interests in rayon, acetate, Arnel triacetate and Teron (polyester fibre—Terylene) now being produced in association with Imperial Chemical Industries Ltd. Nytril fibre will compete both with polyesters and with acrylics.

Darvan, until two years ago known as Darlan, is a copolymer of vinylidene dinitrile and vinyl acetate. It is chemically unique, containing two CN groups attached directly to the same carbon atom. The steric hindrance this creates in the regularly alternating copolymer is believed to explain why the material is paradoxically non-crystalline. It also has a high second-order transition temperature (above 300°F)

Goodrich discovered nytril during a search for a synthetic tyre cord yarn in World War II at their basic research laboratory at Brecksville, Ohio. Limited quantities of the fibre have since 1952 been produced at Goodrich Chemicals' Avon Lake development centre. Rated capacity of this pilot plant is 500,000 lb. a year; it will be run for Celanese until that company can begin production of the fibre for itself. While terms of the purchase have not been revealed, royalty payments are involved and also Goodrich are to retain rights to non-textile uses of the polymer, including plastics and film.

Principal raw materials for nytril are acetic acid and vinyl acetate, both of which are produced by Celanese at Pampa, Texas. The new fibre will be produced at Pampa, but no plans have yet been settled for size or site of a manufacturing plant.

The probable process to be used will be conversion of acetic acid, through intermediate formation of ketene and diacetyl cyanide, to vinylidene dinitrile. This will be copolymerised with vinyl acetate to form a regularly alternating polymer chain with a 1:1 monomer ratio.

Commercial production is expected within a year or so, and according to Celanese president Harold Blancke, world market estimate for Darvan is 36 to 40 million lb. a year.

Programme for Joint Annual Meetings of C.S. and R.I.C.

PROGRAMME for the joint annual meetings of the Chemical Society and Royal Institute of Chemistry, to be held in Queen's University, Belfast, from 5 to 8 April, has now been published. Included are the titles of papers, works visits and social events. Registration forms should be returned before 29 February.

First of the annual meetings, that of the R.I.C., will be held at 10 a.m. on 6 April and will be followed by an address by Mr. E. Le Q. Herbert, president, on 'The chemist and the community.' Annual meeting of the Chemical Society will be held at 10 a.m. on 7 April, and will be followed by an address by Professor H. J. Emeléus, president, on 'Some recent advances in fluorine chemistry.'

A civic reception and dance will be held at 8.30 p.m. on 5 April and the joint annual dinner will take place in the Sir William Whitla Hall at 7.30 p.m. on 6 April. A reception on 7 April will be given at 8.30 p.m. in Parliament Buildings, Stormont by the Government of Northern Ireland, and a reception and dance, at 8.30 p.m. on 8 April, will be given by the university in association with I.C.I.

First paper to be given following registration on 5 April will be on 'Ommochromes, new natural pigments, their biogenesis and physiological importance,' by Prof. A. Butenandt (Max Planck Institute, Munich). Other papers to be given are: 'Some aspects of acetylene-allene chemistry,' by Prof. E. R. H. Jones (Oxford); 'Ion pairs in solvolysis and exchange,' by Prof. S. Winstein (California); 'Metastable protonation and deprotonation products in aqueous solution,' by Prof. G. Schwarzenbach (Zurich); and 'Some modern developments in the study of heterogeneous catalysis,' by Prof. G. M. Schwab (Munich).

Visits will include those to United Chrometanners Ltd., Killyleagh; Ulster Print Works Ltd., Newtownards; International Computers and Tabulators Ltd., Castlereagh; Linen Industry Research Association, Lisburn; U.K. Optical Bausch and Lomb Ltd., Lurgan; Associated Electrical Industries Ltd., Larne; Ulster Brewery Co. Ltd., Belfast; Department of Industrial and Forensic Science, Belfast; Stevenson and Son Ltd., Dungannon; Chemstrand Ltd., Coleraine; and Fisons Milk Products Ltd., Coleraine. A number of coach tours have also been arranged.

Glaxo in Malaya

The new pharmaceuticals, antibiotics and special foodstuffs plant recently opened in Singapore by Glaxo Laboratories (Malaya) Ltd. will have an initial labour force of about 80. It is reported that the range of products made in the $M2 million factory will gradually be increased.

Control Instruments Output at £35 M.

MONEY saved in labour costs when instrumentation was used to its fullest possible extent was among the topics covered by Mr. C. R. King, chairman of the Electricity Council, when he proposed the toast of the British Industrial Measuring and Control Apparatus Manufacturers' Association at the annual lunch in London last week.

Replying to the toast, Mr. V. D. MacLachlan, chairman of B.I.M.C.A.M., said the industry's annual turnover had grown from £3 million in 1944, when the association was formed, to £35 million. The industry's export percentage of turnover was much higher than the national average. He foresaw that the trend towards the shorter working week and greater consumer demand could only be met by the increased use of instrumentation.

Mr. W. G. Thomas, president, proposed the toast of the guests, particularly welcoming Mr. V. A. Kamensky, chief trade representative of the U.S.S.R. in the U.K. Mr. S. W. J. Wallis, British Petroleum Co. Ltd., who replied, said that in the last year he had been concerned with five computer-controlled integrated systems of plant control.

At the 1960 BIMCAM annual luncheon, held in London on 19 January. L. to r.: Mr. A. W. Berry, director, British Engineers Association, Dr. F. M. H. Taylor, vice-president, Institution of Heating and Ventilating Engineers, Mr. V. A. Kamensky, chief trade representative of U.S.S.R. in U.K., Mr. V. D. MacLachlan, chairman, BIMCAM, Mr. C. R. King, chairman, Electricity Council, Mr. W. G. Thomas, president, BIMCAM

Project and Equipment Engineering by P.G.

'PROJECT and Equipment Engineering' is the title of a new booklet issued by P.G. Engineering Ltd., a member of the Power-Gas Group. Illustrating some of the company's major projects, it describes the services offered by the Chemical Plant, Gas Plant, Petroleum Plant and General Contracts Divisions. This is a multi-lingual publication, the text being printed in English, French, Spanish and German.

From Ashmore, Benson, Pease and Co. Ltd., another Power-Gas company, comes a 56-page booklet entitled 'A Service to Industry'. Profusely illustrated and with a liberal use of colour, it describes the many services available to heavy industry, covering design, manufacture, transport, site erection and blast furnaces.

New Laboratory for A.E.A. at Windscale

CONTRACT for the design and procurement for a new laboratory to be installed in the buildings of No. 2 reactor at Windscale, Cumberland, has been awarded by the U.K.A.E.A. to E. G. Irwin and Partners, consulting engineers, of London.

Costing about £1 million, the new laboratory is said to be of the most advanced design in the world, and will handle and examine several thousand fuel elements a year from the nuclear power stations and also from experimental reactors.

Specially-designed remote control machinery is to be installed for the handling of burnt fuel elements and their radiographic examination, and to remove rods from their containers without distortion. Other equipment will be able to measure dimensions and density of the rods and to cut sections for metallurgic examination.

Anglo-Hungarian Trade Agreement

BOTH chemicals and pharmaceuticals are included in the recently signed two-way trade agreement between the U.K. and Hungary, the Board of Trade announce, and applications relating to such goods will be considered.

The arrangements have been concluded on a three-year basis, although actual quotas—current amounts of which have not been divulged—are subject to annual negotiation. It is understood that the home market will remain open to certain Hungarian products without restriction, including vegetable oils and aluminium.

Albright and Wilson Detergents in Italy

A member of the international Albright and Wilson group, Marchon Products Ltd., are reported to be proceeding with plans for the manufacture of detergent raw materials in Northern Italy by their wholly owned subsidiary Marchon Italiana.

The factory site is at Castiglione delle Stiviere, approximately 80 miles east of Milan, and it is anticipated that the plant will be completed by the end of the year.

NEW GRANULATION TECHNIQUES

Dutch State Mines Prilling Procedure for Producing Calcium Nitrate

CALCIUM nitrate, due to the fast action of the nitrogen contained in it, is a very valuable fertiliser which is widely used for top dressing. Hence the need to produce it in an attractive and handy form.

In their manufacture of nitrophosphate Staatsmijnen (Dutch State Mines) obtain calcium nitrate as a by-product. With their process about 60 tons of calcium nitrate are obtained per 100 tons of nitrophosphate. Processing of the $Ca(NO_3)_2 . 4 H_2O$ crystals to a suitable fertiliser, however, has proved a difficult task. First, adhering nitric acid was neutralised with ammonia at pH 4. The molar $\frac{Ca(NO_3)_2}{NH_4NO_3}$ ratio was brought to 5.2 by addition of NH_4NO_3 and the solution concentrated to the required nitrogen content by evaporation. The solution was then processed into a fertiliser containing 15.5% N and consisting mainly of the double salt $5\text{-}Ca(NO_3)_2 . NH_4NO_3 . 10H_2O$.

Production Process

Production of fertiliser was effected by (1) crystallising on a cooling-drum from which the crystals are scraped off to yield a flaked end product, or (2) prilling in air which produces a somewhat granulated product. Shape of the end product is the main drawback to the first procedure. The flake form has very poor storage facilities and it is highly hygroscopic, while recrystallisation which occurs, gives rise to dust formation. Drawback of the second procedure is the strongly retarded crystallisation of the calcium nitrate, which can lead to formation of prill conglomerates instead of loose prills. To prevent this prill towers have to be made very high. Also the final product shows the same drawbacks as the flakes—hygroscopicity and dust formation.

Discussing their investigations at the Dutch State Mines and the completely new procedure developed, P. J. van den Berg and G. Hallie reported at a meeting of the Fertiliser Society on 26 January in London, that the principles of their process have been laid down in several patents and patent applications (British Patent No. 794855). The process is based on the crystallisation of droplets of calcium nitrate in a mineral oil to which seed crystals have been added. After crystallisation the solid prills and the oil are separated by centrifuging.

Advantages of the process are reported to be as follows:

> Controlled-crystallisation in a medium with excellent heat transmission properties makes it possible to manufacture prills of a regular shape and the desired size, while the height of fall in this medium is very small.
>
> When the oil has been centrifuged off, the prills are still coated with a thin film. Addition of special substances to the oil therefore makes it possible to obtain a film which reduces the rate of moisture absorption considerably and gives the prills a dry appearance. Another advantage is that dust formation is suppressed and the product has excellent storage and handling properties.

Main investigations carried out by van den Berg and Hallie were: formation of uniform drops and the effect of oil on drop formation; process of heat transfer in relation with the dimensions of the apparatus and the temperature; separation of oil, and the required strength of the prills; properties of the final product; and outline of the pilot plant.

Formation of Drops. Measurements with a highly concentrated urea solution and a stationary nozzle were made. The solution was ejected vertically downwards by air pressure through a tower about 40 metres high. Temperature was 140°C and the diameter of the nozzle 0.5 mm.

Screen Analysis

Screen analysis of the solidified prills was made and the mean diameter calculated. It was found that at velocities below a given limit the prill diameter is independent of the jet velocity. In this region the mean prill diameter is about twice the orifice diameter and critical velocity about 5 m./sec. In contrast to the findings of Richardson *et al.* the Dutch workers report that it appears that particle diameter increases when the velocity is above the critical limit. The explanation, it is conisdered, lies in the fact that concentrated urea solution (cryst. temperature 132°C) solidifies immediately after the primary drop formation, and the jet cannot disrupt further in spite of its high speed.

Prilling. This is carried out mainly by means of conical or cylindrical perforated cups rotating on a vertical axis. The liquid jets form under the influence of the centrifugal force. Experiments by the Dutch State Mines researchers has shown that the formation of drops from liquid jets issuing from rotating nozzles is a very complex procedure. Average prill diameter, they report, is governed by such factors as speed of rotation, diameter of the prilling cup, nozzle diameter, and properties of the solution (especially the viscosity). It is also noted that, the load being the same, rotary nozzles may have a considerably larger diameter than stationary ones to give a product of the same average diameter.

At present a generally valid relationship for the average prill diameter is being developed. However, van den Berg and Hallie have succeeded in designing large-capacity prilling cups yielding a product of the desired average diameter. Diameter of the cup, they state, is determined by the trajectory described by the drops leaving the apertures. Trajectory of a drop of a given size is governed by the initial velocity and the air resistance.

Using the method given by Lapple and Shepherd (*Ind. Eng. Chem.* 1940, **32**, 605) for calculating the trajectory of a drop leaving through an aperture in the wall of a spinning vessel, the Dutch workers have calculated, at any given moment, the path travelled in horizontal and vertical direction and, hence, the trajectory of the globule. From these calculations the minimum diameter of the prill vessel to be used with this cup at a given oil level, and the diameter of the prill vessel being chosen, it is also possible to calculate the required speed of rotation and cup diameter. Average diameter for the prilling cups of the Dutch State Mines commercial plant is 2½ mm., with 68% of the prills varying between 1.95 and 3.05 mm. in diameter.

Oil Properties and Shape of Prills. Degree of roundness of the prills depends on the magnitude of the interfacial tension (calcium nitrate solution-oil). It is also noted that liquid particles formed into globules over the oil surface under the influence of interfacial tension between the calcium nitrate solution and the air, can be slightly flattened on hitting the oil surface. Whether the prills will re-adopt the globular shape depends on the magnitude of the interfacial tension in the oil. Viscosity of the oil and the size of the liquid drops also play a part, as well as the velocity with which the solution crystallises.

Height of Frill Vessel

Prill Vessel Height and Heat Removal. Of importance in designing a prilling installation using oil as a medium is the height of the prill vessel. Drops formed fall into the oil and almost instantaneously adopt a constant falling velocity. During their fall they transfer part of their heat to the oil to be capable of crystallising to form solid globules. Hence it is necessary to know the amount of heat, Q, which a prill of a given size can transfer per unit time. This amount of heat is given by the equation $Q = h_m XO \times \Delta t$ where Q = heat removed per unit time; h_m = heat transfer co-efficient; O = surface area of the prill; Δt = temperature difference between oil and prill.

If the amount of heat that has to be removed, Q^1, is also known, the falling time follows from the quotient $\frac{Q}{Q^1}$. Falling time and falling velocity then give the height of fall and hence the vertical dimension of the prill vessel.

To determine or calculate the amount

of heat to be removed, the temperature to which the prills have to be cooled down must be known. This temperature is a measure of the amount of solid substance that crystallises and imparts the required solidity to the prill. The lower the final prill temperature, the larger the amount of crystallising solid will be. The prilling oil temperature which has been found most suitable is 50-80°C.

Heat transfer coefficient of oil has been determined by means of a relation derived by Kramers (*Physica*, 1946, **12**, 61) for the heat transfer from smooth spheres in flowing oil, water and air

$$\frac{h_m D_o}{k_f} = 2.0 + 1.3\left[\frac{C_p.\mu}{k}\right]_f^{0.15} + 0.66\left[\frac{C_p.\mu}{k}\right]^{0.31}\left[\frac{D_o G}{\mu_f}\right]^{0.50}$$

$$Nu = 2.0 + 1.3\ P_r^{0.15} + 0.66\ P_r^{0.31}\ .\ R_e^{0.50}$$

where h_m = mean heat transfer coefficient; D_o = sphere diameter; k_f = thermal conductance of the fluid at the film temperature; μ_f = viscosity of the fluid at the film temperature; C_p = specific heat of the fluid at the film temperature; G = mass velocity of the fluid.

The above relation is valid under the following conditions: $10 < Nu < 40$; $0.7 < P_r < 400$; R_e up to 10^5. This relation gives the necessary values for the heat transfer coefficient in oil.

Accuracy of Results

Van den Berg and Hallie have found that the results obtained with this method of calculation can only be approximately correct, but that only a relatively small height of fall is required. For prills of up to 3 mm. in diameter this height is only a fraction of the usual height of air prilling towers.

Separating Oil from Prills. As the oil used in prilling is relatively expensive, the oil content of the final product should be as low as possible. The greater part of the oil is removed by screening and any remaining oil by centrifuging. This only reduces the amount of oil adhering to the prill surface (surface oil) to a minimum. The prills also contain enclosed oil, hence measures have to be taken to prevent the oil from penetrating into the prills during crystallisation.

It has been found that the adhering oil film has a constant thickness. This has been derived from the measurements that the oil content p (% by weight) and diameter d (mm.) are related as follows: $p \cdot d = c$. The constant c is dependent on: the centrifugal force; the temperature and viscosity of the oil applying a centrifugal time of about 1,000 times the gravitational force, a c-value of 0.75 has been found. For calcium nitrate prills this value is 1. Therefore for $Ca(NO_3)_2$ prills with a diameter of about 2.5 mm. the amount of adhering oil (surface oil) will be at least 0.4%.

Enclosed Oil. The amount of enclosed oil depends on the amount of liquid phase present before crystallisation and on the portion of this amount which crystallises before centrifuging. To make crystallisation proceed smoothly, seed crystals containing the double salt $5Ca(NO_3)_2NH_4NO_3.10H_2O$ are added to the oil. The solution crystallises out in the form of this double salt.

Rate of Crystallisation. Working temperature is determined by the strength of the prill required for further treatment under our conditions. The larger the amount of liquid phase in the prill, the weaker the prill will be. Also with regard to seeding, if no seed crystals are added the liquid phase will not crystallise at the crystallisation temperature in the time of fall: and as the percentage of seed crystals is increased a larger amount will crystallise out, with the result that the oil content will increase too.

Solution Composition. In the manufacture of calcium nitrate prills a nitrogen content of 15.5-15.6% and a molar ratio of about 5.2 is necessary. If the latter is higher the solution becomes too viscous, while molar ratios below this value have an unfavourable effect on the storage properties of the final product. The moisture content is 15.9%. Under these conditions the oil content of the prills is almost maximum.

To achieve a lower moisture content inert material can be added; further evaporation is then necessary to reach the same nitrogen content. In the Dutch State Mines process, where the calcium nitrate crystals are obtained as a by-product the solution already contains about 3% of inert material. The solution therefore has to be evaporated to 12.35% moisture. The oil content of the prills is then very low.

Crushing Strength. This will be greater as the degree of crystallisation of the prills is higher. By making the best possible use of those factors which influence the latter, Dutch State Mines have succeeded in making an end product with an extremely low percentage of smalls (about 1%)

Prill Properties

Properties of $Ca(NO_3)_2$ Prills. Rate of moisture absorption can be considerably reduced, it is noted, by addition of a given amount of paraffin wax to the prilling oil. This yields prills which, under moderate climatological conditions, are properly protected against moisture. At a relative humidity of 70% and 25°C, the rate of moisture uptake is reported to be even lower than that of nitrolime and nitrophosphate, and to compare favourably even with urea. A good product suitable for tropical conditions can be prepared.

The diffusion rates of calcium nitrate flakes and prills have been investigated to determine whether the fast action of the product would suffer from the presence of the paraffin coating. Hardly any difference in diffusion between the two products has been noted, barring a slowing down in the first few days of liquefaction of the prills.

Caking tendency of the prills after bagging have been investigated. Only slight caking has been found and on bouncing a bag once the prills loosened again completely. A good bag must be used for bagging prills as the fluidity of the prills during transport can give rise to bag-cracking.

The Prilling Plant. Two circuits are involved: the circuit for the solution and the oil circuit.

Calcium nitrate solution is evaporated to the desired nitrogen content. In the pilot plant this was done in evaporation vessels provided with steam coils and stirrers. The evaporated solution then passed to a storage tank and then fed to the prilling cup. Before entering the prilling cup, the solution first passes through a 'levelling vessel'. This is necessary to ensure uniform and constant feed to the prilling cup. The solution (between 135° and 140°C) is prilled to form drops of the desired diameter which fall into the oil tank.

Oil in the prill vessel is kept at a given temperature by recycling and cooling. Prills are discharged from the prill vessel through a valve. The bottom of this prill vessel is conical in shape so that a minimum amount of oil (about 30%) will be discharged with the prills. It is also stated to be essential to keep the accumulated mass of prills in the conical section at a constant level for the same reason.

Prills and oil are then fed into the centrifuge. In the case of a discontinuous centrifuge, the prills are delivered into a charging bucket pivoted on a horizontal shaft. The bucket is provided with a discharge nozzle for the prills and a bottom sieve through which the major portion of the oil is drained off. After centrifuging, the prills are bagged.

Oil separated from the prills goes to an oil collecting tank. This oil before being fed back to the prill vessel is freed from calcium nitrate particles to keep the vital parts of the plant and in particular the oil coolers, free from dust deposits. The oil is therefore first pumped into a settling tank where the dust is allowed to settle and the clean oil is carried to the oil reservoir through an overflow pipe. From the reservoir the oil passes to a heat exchanger where it is cooled to the desired temperature in countercurrent with water. Oil not discharged with the prills leaves the prill vessel through an overflow trough and also passes via the settling tank to the out reservoir.

Liverpool Science Block Nears Completion

First instalment of Liverpool's new College of Technology is now nearing completion. A five-storey building, it will accommodate the departments of pharmacy, chemistry and physics. Each floor is planned in the form of teaching and research laboratories with separate lecture theatres, teaching classrooms and ancillary storage accommodation.

Will

Sir Alfred Charles Glyn Egerton, M.A., F.R.S., Professor of Chemical Technology, London University, 1936-52, and secretary of the Royal Society, 1938-48, who died on 7 September last aged 72 years, left £67,680 net (duty paid £33,397). He bequeathed £5,000 to the Royal Society for the benefit of its general purposes fund "in memory of my work for the said Society."

O.E.E.C. SURVEY OF CHEMICALS

Only Few Countries Supply Output Statistics for Basic Chemicals

DEVELOPMENTS in the principal products in the basic chemical sector —soda ash, caustic soda, chlorine, sulphuric acid, synthetic ammonia and calcium carbide—have again been examined by the O.E.E.C. chemical products committee. (*Chemical Industry in Europe 1958-59.*)

Soda ash. Only France, Germany, Norway, Portugal and the Netherlands can supply production statistics in tons.

Soda Ash Production
(In thousand tons of Na_2CO_3)

	1957	1958	1959 1st half
France	826	742	335
Germany	989	902	464
Netherlands	—	88	n.a.
Norway	20	19	n.a.
Portugal*	16	18	n.a.

* Excluding Na_2CO_3 for NaOH manufacture.

In the U.K. the index for soda ash production fell from 119.8 in 1957 to 112.9 in 1958. The index for Austria is given as 118.8 in 1958 compared with 110.8 in the previous year. Output in O.E.E.C. countries therefore appears to have fallen as a whole in 1958 as a result of both of the fall in demand from the main industrial users and a decline in exports since production capacity is being extended in former overseas markets.

Some improvement was shown in output in the first half of 1959 in the U.K., and the index was 118 as against 111 in the corresponding period of 1958. Belgian production was higher too, and in the first four months of 1959 was 12% higher above the same period in 1958.

U.S. production of soda ash is estimated by the O.E.E.C. committee at 3,930,000 metric tons in 1958, compared with 4,230,000 tons in 1957, a decrease of 7%. Output in the first half of 1959 amounted to 2,168,000 tons.

Caustic soda. In only four of the nine O.E.E.C. countries did output of caustic soda increase. In Belgium and the U.K.

Caustic Soda Production
(Solid and Lye)
(In thousand tons of NaOH)

Country	1957	1958	1959 1st half
Denmark	4	3	—
France	467	495	240
Germany	648	636	334
Italy	282	—	*
Norway	40	42	—
Portugal	17	19	—
Sweden	123	142	—

* For first 4 months index of production was 29% higher than in corresponding period of 1958.

the index of production showed a marked decline compared with 1957. Belgium's production index fell from 112 to 82 in 1958 and the U.K. index from 112 to 102. Two countries showed increased output, however, France and Sweden, where chlorine output has expanded rapidly.

Production of caustic soda in the U.S., where by far the greatest part is made by the electrolytic process, fell by 7% in 1958. Output totalled 3,682,000 tons, compared with 3,947,000 in 1957. In the first six months of 1959, 2,046,000 tons of caustic soda were manufactured.

Chlorine. This product showed a considerable levelling-off in 1958. For O.E.E.C. countries combined it is believed that output rose by about 4% in 1958 compared with 8% in 1957 and 6% in 1956. And in only France, Italy, Portugal and Sweden was output considerably higher.

Chlorine Production
(In thousand tons)

Country	1957	1958	1959 1st half
Denmark	4	3	—
France	211	245	131
Germany	520	538	284
Italy	149	—	—
Norway	35	36	—
Portugal	0.6	0.9	—
Sweden	107	123	—

Index of chlorine production in the U.K., fell from 139 in 1957 to 134 in 1958, but the decline in the Belgian index was much greater. This fell from 222 in 1957 to 126 in 1958. Output in Belgium was unchanged during the first months of 1959 whereas in the U.K. the index was 4% higher than in the first six months of 1958.

The U.S. trend is very little different from that in W. Europe. Output of chlorine fell from 3,584,000 metric tons in 1957 to 3,269,000 metric tons in 1958, a decline of 7%. The situation improved in the first six months of 1959 when production amounted to 1,856,000 tons.

Calcium carbide. This chemical suffered less than chlorine from the slowing down in the organic chemical industry's rate of expansion in 1958. In O.E.E.C. countries combined output rose by 9%. U.S. commercial production of CaC_2 fell from 923,000 tons in 1957 to 820,000 tons in 1959 when output totalled 461,000 tons.

Calcium Carbide Production
(In thousand tons of CaC_2)

Country	1957	1958	1959 1st half
France	283	346	166
Germany	960	997	477
Italy	247	321	†
Norway*	57	60	—
Netherlands	44	40	—
Portugal	4	6	—
Sweden	81	—	—
United Kingdom	142	147	83

* Excluding CaC, used for Ca cyanamide and dicyandiamide manufacture.

† For first 4 months 1959, index of production was 12% higher than corresponding period in 1958.

Primary ammonia. A considerable increase in output is shown for 1958 by seven O.E.E.C. countries. Output in Austria increased by 7% in 1958, the index rising from 166 in 1957 to 178 in 1958.

U.S. production of synthetic ammonia amounted to 3,479,000 tons in 1958 compared with 3,391,000 tons in 1957, a 3% increase.

Primary Ammonia Production
(In thousand tons of N)

Country	1957	1958	1959 1st half
BLEU	234	275	—
France	521	593	330
Germany	1,054	1,121	523
Italy	401	437	*
Netherlands	336	348	—
Norway	220	240	—
Portugal	13	30	—

* 1st 4 months 1959, index of production 14% higher than corresponding period 1958.

Sulphuric acid. As in 1957, there was a marked slowing down in 1958 in the rate at which sulphuric acid expanded. Output rose by 2.3% last year, compared with 3.4% in 1957 and 5.5% in 1956. The percentage of total consumption of acid was taken by the fertiliser industry and remained stable over the years 1957 and 1958. A marked tendency has been noted for more sulphur to be used for the manufacture of sulphur-bearing materials. This trend was accentuated in 1958.

Production and Consumption of Sulphuric Acid
(In thousand tons 100% H_2SO_4)

Country	1957 Production	1957 Consumption	1958 Production	1958 Consumption
Austria ...	80	99	117	128
BLEU	1,073	931	1,087	984
Denmark ...	191	194	184	189
France	1,600	1,633	1,786	1,784
Germany ...	2,723	2,852	2,920	3,000
Greece ...	106	106	106*	160*
Ireland ...	60	60	60*	60*
Italy	2,055	2,036	1,949	1,883
Netherlands ...	700	720	745	740
Norway ...	91	102	82	77
Portugal ...	245	245	271	271
Sweden ...	394	397	385	389
Switzerland ...	125	118	121	115
Turkey ...	22	47	19	23
U.K.	2,373	2,409	2,277	2,304
Total O.E.E.C.	11,833	11,949	12,109	12,053
Spain	960	960	—	—
U.S.	15,428	15,457	15,053	15,053

* Figure for 1957.

Uses of Sulphuric Acid
(All O.E.E.C. Countries Combined)
(as a percentage)

Year	Fertilisers	Textiles	Metallurgy	Other Uses
1956	53.9	11.2	3.8	31.1
1957	53.5	11.6	3.8	31.1
1958	53.6	9.9	3.6	32.9

* *Continued from 'Chemical Age' 23 January, p. 167, and 16 January, p. 131.*

Restrictive Practices Hearing on Phenol

DATE fixed for a hearing on phenol under the Restrictive Trade Practices Act is 15 February, and it is understood that the respondents are the Phenol Producers Association (and members) and the Registrar of Restrictive Trading Agreements.

During 1959 the Restrictive Practices Court had 39 agreements before it, seven of which were defended; and the Court found five to be "contrary to the public interest", and one agreement and one restriction in another agreement to be consistent with such interest.

At the year-end some 120 cases were at various stages of preparation for trial. In addition to these there are said to be a great many agreements closely related to them.

U.K. Chemical Exports and Imports for 1958 and 1959

Record Exports. U.K. exports of chemicals in 1959 were at a record level, totalling £293,099,465, a higher figure than was anticipated. This was £31.5 million (or 12%) higher than the 1958 figure of £261,528,368 and compares with a 1957 total of £267,432,119. Imports were also at a record level, totalling £138,366,311, a 15.2% rise over the 1958 total of £120 million. The favourable balance in U.K. overseas chemical trade in 1959 of £154.8 million is 9.4% above the 1958 balance of £141.4 million.

EXPORTS		QUANTITY 1958	QUANTITY 1959	VALUE 1958	VALUE 1959
INORGANIC				£	£
Acids	Cwt.	179,994	179,096	700,308	664,565
Copper sulphate	Tons	26,507	31,083	1,631,587	2,098,172
Sodium hydroxide	Cwt.	3,820,719	5,011,360	4,355,799	6,293,821
Sodium carbonate	,,	3,719,717	3,994,133	2,586,394	2,512,707
Aluminium oxide*	Tons	38,243	33,424	1,238,497	1,202,794
Aluminium sulphate	,,	34,697	30,263	497,646	413,632
Other al. cpds.	,,	3,348	4,823	169,885	202,596
Ammonia	Cwt.	90,029	94,556	348,258	352,608
Ammonium cpds., not fertilisers or bromide	Tons	19,172	17,433	738,980	651,284
Arsenical cpds.	,,	3,123	2,539	215,972	184,300
Bismuth cpds.	Lb.	379,689	386,746	306,606	305,067
Chloride of lime	Cwt.	264,550	289,198	462,452	495,439
Hydrosulphite	,,	63,839	111,653	461,962	825,210
Other bleaching mats	,,	170,514	191,968	802,178	844,957
Calcium cpds.	,,	408,265	407,681	803,122	824,283
Carbon blacks*	,,	767,155	1,023,678	2,924,190	3,806,779
Cobalt cpds.	,,	19,003	20,002	680,470	579,617
Iron oxides	,,	82,036	95,414	258,722	294,914
Lead cpds.	,,	76,301	70,639	366,717	331,995
Magnesium cpds. (n.e.s.)	Tons	15,902	36,476	816,952	1,434,067
Nickel salts	Cwt.	65,856	96,208	686,634	878,082
Potassium cpds. (not fertilisers or bromides)	,,	56,919	73,480	550,790	650,536
Sodium: Bicarbonate	,,	674,043	773,761	609,842	700,926
Phosphates	,,	201,142	278,795	847,993	1,076,291
Silicate	,,	343,798	324,054	311,315	322,352
Other sodium cpds.	,,	1,721,831	1,689,512	3,985,505	4,016,467
Tin oxide	,,	7,705	9,926	265,523	333,566
Zinc oxide	Tons	9,024	11,094	663,718	816,559
Inorganic elements or cpds., n.e.s.	—	—	—	4,466,444	5,489,157
ORGANIC					
Acids anhydrides, salts & esters	—	—	—	1,720,664	2,908,092
Glycerine	Cwt.	48,038	47,335	479,884	544,824
Ethyl alcohol, etc., & alcohol mixtures, n.e.s.	—	—	—	1,700,881	2,515,933
Actone	Cwt.	182,485	135,004	531,489	391,971
Citric acid	,,	45,533	61,175	475,601	562,674
Gases, compressed, liquid or solid, n.e.s.	—	—	—	2,376,279	1,343,549
Phenol	Cwt.	168,196	200,481	1,035,447	1,179,328
Salicylates	Lb.	722,937	680,603	180,519	165,072
Sodium cpds.	Cwt.	22,919	35,250	345,830	352,952
Sulphonamides, not prepared	Lb.	1,904,197	1,488,518	1,164,977	856,410
Dye intermed., n.e.s.	Cwt.	83,301	101,332	1,014,459	1,570,023
Organic cpds., n.e.s.	—	—	—	16,545,151	19,141,954
Coal tar	Tons	73,288	55,146	829,679	641,293
Cresylic acid	Gall.	1,830,033	3,030,865	637,928	1,013,349
Creosote oil	,,	16,739,109	26,648,525	1,151,413	1,624,295
Other min. tar, etc.	—	—	—	374,029	627,923
Pigment dyestuffs	Cwt.	27,669	35,946	1,276,184	1,593,925
Other syn. org. dyes	,,	163,653	197,910	8,001,628	10,128,025
Syn. org. pigments	,,	23,117	26,371	944,364	1,074,308
Tanning extracts	,,	111,214	102,905	474,591	411,044
Syn. tanning mats.	,,	79,160	69,989	307,682	283,907
Pigments, paints, varnishes, putty, etc.	—	—	—	23,469,713	26,354,322
Drugs, medicines, etc.	—	—	—	37,646,225	40,094,669
Essential oils	Lb.	2,146,091	2,305,256	2,329,151	2,232,902
Explosives (not inc. nitro-cellulose)	—	—	—	10,498,529	10,051,382
Carbons	Cwt.	64,889	75,747	273,599	363,717
Tetraethyl lead	Gall.	5,269,651	6,210,515	11,415,796	12,682,689
FERTILISERS					
Ammonium nitrate	Tons	1,171	1,083	37,364	35,630
Ammonium sulphate	,,	303,559	213,948	4,887,854	3,108,726
Other fertilisers	—	—	—	212,705	249,155
Disinfectants, sheep & cattle dips, etc.	Cwt.	141,475	126,007	986,491	823,613
Weedkillers	,,	55,305	57,078	747,694	861,926
Other, inc. insecticides*	,,	270,534	382,515	3,713,360	5,697,258
MISCELLANEOUS					
Plastics materials	Cwt.	2,452,376	3,147,208	32,146,382	39,983,829
Of which polystyrene	,,	212,920	253,634	2,496,730	2,664,328
Polythene	,,	20,460	32,538	477,350	637,776
P.v.c.	,,	506,148	627,550	6,314,536	7,195,754
Photographic chems.	,,	38,714	41,022	679,057	722,466
Lab. & chem. glassware	,,	22,136	24,997	1,178,777	1,383,951
Gas & chem. machinery	,,	244,389	148,489	5,265,141	5,446,138

IMPORTS		QUANTITY 1958	QUANTITY 1959	VALUE 1958	VALUE 1959
INORGANIC				£	£
Boric acid	Cwt.	69,433	72,900	225,039	237,921
Arsenic trioxide	Tons	6,891	4,640	215,438	139,550
Aluminium oxide	,,	27,957	13,221	1,736,871	885,061
Silicon carbide	,,	7,942	9,162	891,675	1,000,463
Borax	Cwt.	474,355	511,640	1,011,625	1,069,509
Calcium carbide	,,	1,456,757	1,582,498	2,824,591	2,769,494
Channel black	,,	173,160	155,743	1,005,601	957,934
Other carbon blacks	,,	97,184	150,935	383,861	693,986
Cobalt oxides	,,	6,330	11,340	399,494	504,101
Iodine	Lb.	1,112,707	1,130,621	379,267	369,890
Mercury	,,	1,461,544	1,955,995	1,441,588	1,850,039
Sodium, calcium, potassium, lithium	Cwt.	116	191	29,098	26,796
Potassium carbonate	,,	103,443	96,811	336,084	300,455
Selenium	Lb.	127,529	207,430	377,106	515,735
Silicon	Tons	6,898	7,432	1,110,961	1,041,275
Sodium chlorate	Cwt.	135,297	115,451	445,755	344,158
Titanium oxides	,,	2,603	35,228	18,260	166,565
Inorganic cpds. n.e.s.*	—	—	—	5,076,631	6,674,288
ORGANIC					
Acids, anhydrides, salts & esters	Cwt.	—	—	2,533,386	2,639,500
Glycerine	,,	211,153	191,059	1,444,942	1,558,366
Menthol	Lb.	145,494	199,374	255,191	370,458
Alcohols & mixtures	—	—	—	3,690,448	4,934,995
Spirits of turpentine	Gall.	971,217	825,088	211,350	198,229
Styrene (monomer)	,,	2,441,093	2,450,077	1,071,769	1,001,123
Vinyl acetate (monomer)	Tons	5,026	5,375	570,709	584,535
Organic cpds., n.e.s.*	—	—	—	16,926,740	22,353,499
Syn. dyestuffs*	Cwt.	27,018	40,344	2,554,975	4,015,922
Dyeing extracts	,,	14,715	12,456	111,635	103,771
Tanning extracts	,,	653,757	633,008	2,084,733	1,973,071
Pigments	,,	235,472	123,097	530,611	281,027
Other pigments, paints, etc.	—	—	—	1,029,818	1,322,957
Antibiotics	—	—	—	829,713	707,155
Other drugs, etc.	—	—	—	9,037,790	3,730,938
Plastics materials	Cwt.	825,446	1,089,667	15,578,755	19,820,194
Of which, p.v.c.	,,	332,626	339,895	3,267,723	3,980,019
FERTILISERS					
Basic slag	Tons	114,958	105,817	927,815	824,688
Potassium chloride	Cwt.	11,635,350	12,276,316	9,535,797	9,891,434
Potassium sulphate	,,	322,864	500,701	302,651	439,151
All other	—	—	—	2,503,160	5,178,238
Phosphates of lime	Tons	1,067,452	1,062,519	7,059,826	6,471,960
Disinfectants, insecticides, etc.	Cwt.	58,019	56,364	2,296,320	1,208,893
MISCELLANEOUS					
Chromium ore	Tons	178,241	165,316	2,270,328	1,796,935
Tantalum & niobium ores & concentrates	,,	474	532	340,584	338,350
Titanium ores	,,	269,312	252,280	2,987,531	2,225,681
Sulphur	,,	327,641	375,381	3,713,154	4,020,550
Gas & chem. machinery	Cwt.	25,915	18,090	1,276,728	837,200

* The figures for 1959 are not completely comparable with those for 1958.

TRADE WITH PRINCIPAL MARKETS

COUNTRY	EXPORTS 1958	EXPORTS 1959	IMPORTS 1958	IMPORTS 1959
Ghana	4,659,938	6,203,402	—	—
Nigeria	5,931,799	7,017,667	—	—
South Africa	12,273,149	11,780,436	2,538,475	2,511,792
Rhodesia & Nyasaland	2,432,514	2,477,675	202,363	165,782
India	12,288,516	15,673,950	701,845	608,064
Pakistan	4,063,428	3,743,465	—	—
Singapore	4,144,688	3,673,346	539,307	582,200
Malaya	4,044,419	3,810,739	293,663	297,086
Ceylon	3,592,189	4,267,531	126,546	278,418
Hong Kong	3,699,955	5,807,989	252,218	155,103
Australia	23,452,645	24,063,828	540,755	499,413
New Zealand	9,429,066	7,233,566	989,099	1,020,538
Canada	8,644,101	9,602,667	9,820,326	8,915,094
Eire	7,140,051	8,466,913	346,146	440,356
Finland	2,835,359	3,467,836	—	—
Russia	—	—	259,914	500,062
Sweden	7,628,035	9,485,663	2,866,578	3,100,202
Norway	4,648,699	5,193,895	3,480,060	4,036,242
Denmark	5,171,756	5,604,114	608,516	654,228
Poland	1,179,181	1,271,695	1,289,397	1,958,975
W. Germany	10,463,893	11,072,051	21,388,863	24,014,932
E. Germany	—	—	1,969,924	2,211,816
Holland	9,942,804	11,955,529	8,458,574	10,310,360
Belgium	6,211,487	6,830,854	4,162,977	5,623,316
France	7,672,142	6,986,281	10,940,432	12,642,882
Switzerland	3,067,787	3,729,655	5,097,820	6,292,372
Portugal	2,825,252	2,951,203	1,091,168	1,622,529
Spain	2,141,553	1,677,557	2,553,355	2,512,580
Italy	7,718,645	9,354,482	2,917,536	3,998,351
Austria	1,020,300	1,276,488	—	—
Turkey	909,336	2,368,067	—	—
Iran	3,172,332	3,591,100	—	—
Burma	2,067,107	2,733,820	—	—
China	3,014,545	3,536,254	1,861,766	928,978
Japan	1,919,335	3,074,851	1,205,375	1,256,876
U.S.A.	7,805,547	11,479,386	27,091,234	33,753,273
Venezuela	2,858,123	3,372,686	—	—
Argentina	4,541,698	4,759,348	809,239	740,797
Totals	**261,528,368**	**293,099,465**	**120,013,400**	**138,366,311**

EQUIPMENT NEWS

Chemical Plant: Laboratory Apparatus: Handling and Control Equipment

ELECTRO-PNEUMATIC FLOW-CONTROL

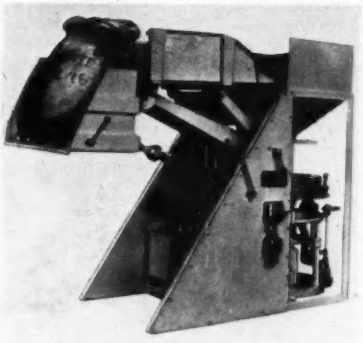
An improved version of their range of electro-pneumatically operated slides for material flow control has been developed by **Lindars Automation Ltd.**, 143 Maple Road, Surbiton, Surrey. The units are fabricated from mild steel, and are complete with air cylinder, solenoid operated air valve, open and closed position detection switch, and an air-release valve for emergency hand operation and maintenance.

The design is claimed to preclude the possibility of jamming by the elimination of guides and easy fixing is arranged by the double flanged construction.

Six standard sizes range from 4½ in. by 4½ in. to 18 in. by 18 in. and they are available as single units or as part of complete control installations. Special sizes and fully dustproof versions are also available.

THE RUSSELL 'LIFTIP' MACHINE

The 'Liftip' has been designed to lift and tip sacks, drums, bins, etc., and can be positioned close to the receptacle into which discharge is to be made. It has a steel frame with two lifting arms operated by



Russell Liftip

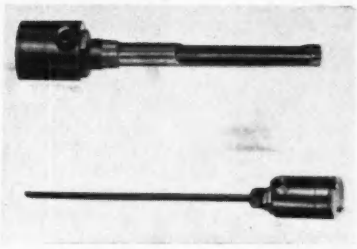
independent hydraulic rams which lift and tip the hopper holding the container. The drive is by a 3 h.p., 400-440, 3-phase, 50-cycle, 1,425 r.p.m. electric motor coupled direct to a hydraulic pump.

The machine, by **Russell Construction Ltd.**, Russell House, Adam Street, London, W.C.2, weighs approximately 5 cwt. and can lift and tip up to 6 cwt. and will discharge at heights from 3ft. to 8 ft., and can be supplied on wheels.

The steel hopper, an optional extra equipped with valve, is bolted to the main frame. Quick-release screw clamps are provided for holding the drum, bin or carton, while for sacks a special retractable claw is provided.

ELECTRODES FOR LEVEL CONTROL

New electrodes for use with the Leveltron level controller that have now been developed by **Thomas Industrial Automaticion Ltd.**, Station Buildings, Altrincham, Ches, can be sited any distance up to 500 ft. from the controller without any electronics in the head of the probe. This is said to help solve a great number of application problems and to set a new standard in capacitance level detection. Five types of electrodes are available, type CE200 being of straight rod design for vertical use in liquids. It can be



Two of the electrodes available for use with the Leveltron industrial proximity switch, type CE203 above and type CE202 below

covered with p.v.c., Alkathene, Fluon, etc. and stainless steel electrodes and fittings are available.

Type CE202 is designed for use with light powders and materials of a low dielectric constant. It is claimed to eliminate material 'build up' problems and is intended for high level applications. Type CE204, a heavier version of CE202, is designed for low level applications. It will withstand wear from abrasive materials because of a metal sheath arrangement and is also said to prevent material 'build up'. CE203, for heavy industrial use, is suitable for either high or low level applications, in bulky solids.

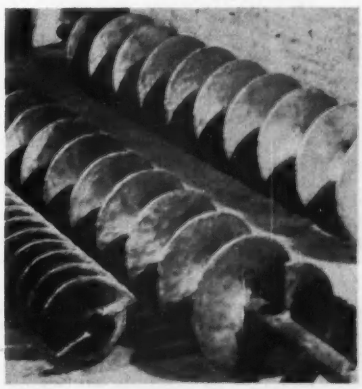
Type CE201 electrode completes the range, having been introduced for level detection in very large hoppers. It can cover a full range of materials from light powders to bulky solids.

TEXOLAG INSULATION PROTECTION

Introduced by **R. A. Brand and Co. Ltd.**, Letchworth, Hertfordshire, is a plastics coating system, Texolag, for preserving insulation materials on pipelines, storage tanks, reaction vessels and other types of process equipment, including chemical plant insulation which may be exposed to spillage or leakage of chemicals.

Continuous pipelines and regularly shaped vessels may be protected by using Texolag base, which consists of fabric impregnated with a plastics composition, wrapped round the insulation surface over a coat of sealing compound and then sealed with a special lacquer. The system may be used on any equipment where the temperature of the external surface of the insulation does not exceed 160°F or fall below −30°F: it is said to be very resistant to spread of flame.

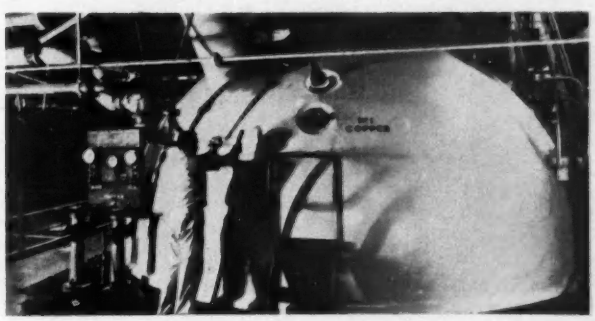
HARD-SURFACE COATED SCREW FLIGHTS



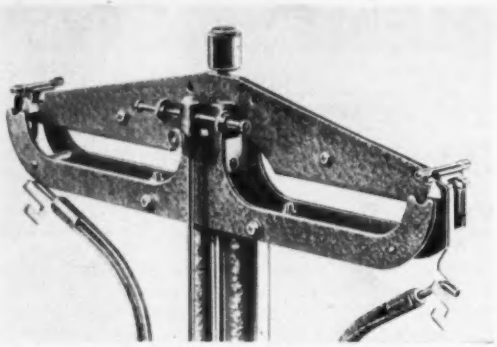
Screw flights used in handling of calcium carbide, hard-surface coated by A. S. Young and Co. Ltd., Woodside Lane, N. Finchley. The larger flights are 11 ft. long, covered with 3 1/16 in. metal-spray coating. The firm handle many similar jobs in connection with corrosive chemicals

GRIFFIN MINOR BALANCE

First of a new series of balances designed for general purposes but incorporating analytical features, has been produced by **Griffin and George Ltd.**, Ealing Road, Alperton, Wembley, Middx. The



Process vessel that is being protected from corrosion by Texolag



General-purpose balance by Griffin and George

Griffin Minor balance, as it is named, has a short beam for speedier weighing; single-limb bows carrying the weighing pans for unimpaired operation. An inclined scale rises with the pointer, facilitating reading and avoiding parallax. A unique design in stirrups is said to protect knife edges, while a new design pillar allows easy and rapid assembly.

The improved assembly of the agate bearings is important because they are held in position by positioning screws instead of being 'drifted in,' which is the usual practice. When the beam is arrested all the agate bearings are relieved; usually only the central bearing is. This is said to give much longer life.

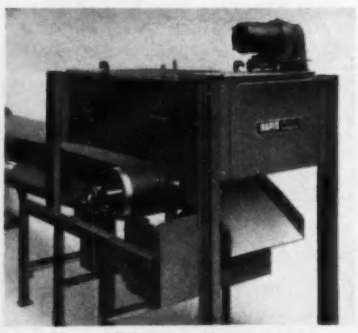
Capacity is 250 g., and the Griffin Minor is sensitive to 2 mg. The moulded plastics pans are 4in. in diameter. Height is 13½in, length 12in, and depth 6¼in. Price of the balance in the U.K. is £7 5s.

RAPID MAGNETIC SEPARATOR

THE new APS separator by **Rapid Magnetic Machines Ltd.,** Lombard Street, Birmingham 12, is designed to handle high throughputs of fine mesh material containing a high percentage of magnetics and demanding severe agitation after pick up in order to ensure a clean, high-grade magnetic fraction.

Typical applications are recovery of magnetite from crushed ore, separation of steel shot from scale, and recovery of iron from crushing fines in slag processing plants. Throughputs of up to 30 ton/hr. are possible on an 18 in. wide machine.

The rapid alternate pole magnetic separator consists of a self-discharging electro or permanent polarity magnet unit suspended at the terminal end of a short centred conveyor. A hopper with jig shaker feeder is provided and dividers are incorporated at the point of discharge for collection of high-grade non-magnetic fraction and middling product if required. Where feed conveyors are already available the overband magnetic unit can be offered separately.



New APS magnetic separator

SINEX ENGINEERING DEVELOPMENTS

Two new developments are announced by **Sinex Engineering Co. Ltd.,** North Feltham Trading Estate, Feltham, Middlesex. Redesigned to enable users to fit new wire or nylon mesh screens are the firm's suspended bowl-type vibratory screens. The previous design made use of a screen mounted on a beechwood ring, supplied as a complete assembly. In the latest model, however, the wire mesh is simply folded upwards round the edge of the bowl and held in position by a circular clamp, making screen replacement a cheaper procedure.

Suspended bowl vibratory screen

Recent experiments at the Sinex works have shown that many types of granular materials, after filling into paper sacks, can be flattened and compacted by passing them over a vibrating table, models of which have been developed for compacting, and standard units from 12 in. by 12 in. to 6 ft. by 4 ft. are utilised.

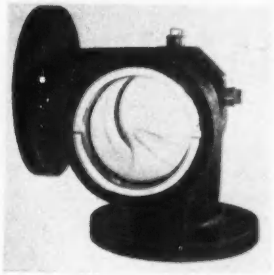
Principal advantage is that the contents are not submitted to any mechanical pressure and, consequently, neither the sack nor the contents are crushed or damaged. The space taken for storage or transport of the filled sacks is reduced by up to 20%.

When placed on the table, 1-cwt. sacks can be moved with one finger, due to the reduction of friction by vibration, consequently when passed over the table on a rubber belt there is negligible friction on the underside of the belt.

NEW FLANGED FLOW-SIGHTS

INCREASED range of flow indicating and control instruments to include flanged versions as well as screwed is announced by **Liquid Systems Ltd.,** Holmethorpe Avenue, Redhill, Surrey.

The illustration of the model LS.150 3-in. angled gravity flow-sight shows two plugged inlets available for either thermometer, vent or vacuum line connections as may be required. Model LS.140 is the straight version. All instruments can be made in acid resisting bronze, and are also supplied in cast iron, steel or stainless steel. They are available up to 6 in. nominal bore.



3 in. angled flow-sight

TO MEASURE GAMMA RADIATION

POWERED by an ordinary car battery, the Gammagraph model 65A developed and manufactured by **Electronic Instruments Ltd.,** Richmond, Surrey, makes a continuous recording of gamma radiation, in or out of doors, making it particularly suitable for measuring fall-out in the vicinity of nuclear power stations.

The instrument measures 30 in. high by 9 in. diameter, is completely mobile, and is said to make such recordings as simple as those of, for example, barometric pressure at a meteorological station. It was first introduced to the public at the 1960 Physical Society exhibition.

SIMMONDS SOLENOID VALVE

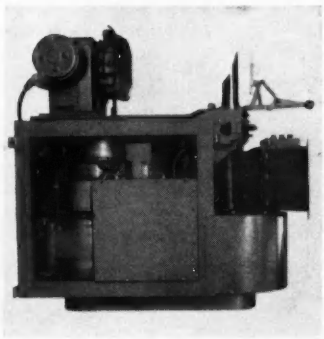
A SOLENOID-operated valve, for installation in liquid-carrying pipelines, has been introduced by **Simmonds Aerocessories Ltd.,** Treforest, Pontypridd, Glamorgan, a member of the Firth Cleveland Group.

The purpose of the valve is to start or stop the flow of liquid in a pipeline by establishment or failure of the electric supply. The valve may be used as a remotely-controlled stop valve. One important application is its closure to keep a pipeline full of liquid, in the event of current failure to the motor driving the pumps.

The solenoid-operated stop valve is

available for operation from d.c. or a.c. supplies, and both flameproof and non-flameproof versions are available.

WEIGHING, PACKING MACHINE THE UNIT shown is suitable for weighing difficult - to - handle powdery materials into valve sacks at the rate of 2/3 bags a minute. A bag settling device can be



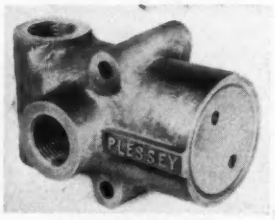
Combined weigher-valve packer

incorporated so that minimum sized sacks can be used. An agitator is incorporated within the feed inlet of the machine, so that material will not arch.

The weigher/packer has been accepted by the Board of Trade Standards Department for weights and measures acceptance, and the makers, **Richardson Scale and Co. Ltd.**, Albert Street, Bulwell, Notts, have a test unit in their works for trials with various products.

NEW PLESSEY VALVE A NEW relief valve, the 10HV, has been designed and produced by the industrial hydraulics division of the **Plessey Co. Ltd.**, Ilford, Essex.

With a working temperature of 0-100°C, this new addition to the range



10HV relief valve

is said to meet the demand for a compact and stable pilot-operated relief valve capable of accepting flows of up to 10 g.p.m. with a pressure range of from 100 to 3,000 p.s.i.

A feature of this new valve is its flat characteristic over a wide flow range, achieved "as a result of extensive research in the Plessey hydraulics laboratory".

FILTER FOR ULTRASONIC CLEANERS THE Type 1181 filter unit has been introduced by **Dawe Instruments Ltd.**, 99 Uxbridge Road, London W.5, for the continuous removal of solid matter from ultrasonic cleaning baths of their own or other design. Fluid is drawn from the bottom of the cleaning bath by a centrifugal pump and returned to the top of the bath by way of a filter having a robust sintered element of stainless steel, capable of removing all solids down to a size of below 2 microns from 8 gall. of liquid an hour. Seven coarser filter elements can be substituted to give flow rates as high as 60 gall./hr. Changing elements either for cleaning or to obtain a different pore size is rapidly effected.

Overall dimensions of the unit including pump and 200 W electric motor are 12 in. by 6½ in. by 10 in. high and the weight is about 15 lb. All metal parts in contact with the cleaning fluid are of stainless steel. The interconnecting tubing is of tough, extruded nylon. Larger filters are available which can also provide for temperature control of the cleaning fluid.

Avo Incident Detection System for Plutonium Processing Plant

Avo Limited, Vauxhall Bridge Road, London S.W., a company in the Metal Industries Group, have secured a contract from the Atomic Energy Authority to install the Criticality incident detection system. The system was designed by the A.E.A. for the detection of radiation in the second plutonium processing plant now being installed at Windscale, Avo instruments were specified.

Decimal Desk Calculator Simplifies Multiplication and Division Problems

A UNIQUE and new approach to calculations which, basically, are multiplication and division problems is accomplished with the Unical decimal desk calculator. It consists of 99 printed tables, each pre-fixed by a number from 1 to 99, bound in a special binder which in itself forms a stand. These 99 tables give the results of the digits 1 to 9,999 multiplied by 1 to 99. Results are completely accurate. Larger sums can be multiplied easily by a few additions of pre-calculated results. The most useful application is for problems involving four digits by two, four or six digits. In division the dividend is unlimited, but the divisor is limited to four digits.

The tables show a basic decimal point but this can be shifted as required, and zeros can be added without limit.

Layout is designed to find 'at a glance' percentages and net remainders, and a constant can be broken down by any percentage or at the same time a column of percentages, or into percentages against known quantities.

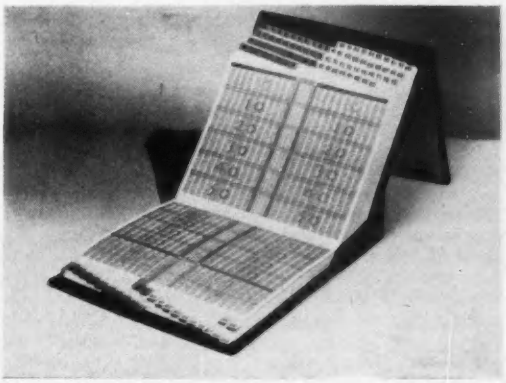
Horizontally table 1 gives the numbers 1.00 to 1.95 (and in the centre a table of differences from 1 to 4) so that digits from 1.00, 1.01, 1.02 are available up to 1.99. Table 10 goes from 10.0 to 10.99, table 99 from 99.00 to 99.99. On each side of the table of differences is the vertical column from 1 to 99, followed, in the bottom portion by the fractions. The digits are therefore developed vertically, and one can carry out different calculations at the same time on one table. As one can obtain accuracy to any number of significant places (or decimal places) this is a very useful system.

This calculator does most of the calculations which one can do on the slide rule (except square roots) but it has the advantage of being quite accurate, and of having four basic digits in multiplication and allowing for an unlimited dividend. Compared with a calculating machine it is interesting because one can read many calculations straight off the tables.

The fractions column can be used for a variety of problems—months, weeks, four weekly periods, minutes of the hour, percentages, etc. Although £ s d calculations cannot be made directly, it is quite easy to work in shillings and decimals of shillings, or in pence and decimals of pence. Calculations in foreign currencies can of course be made quite easily, as can conversion from foreign into English currency and vice versa.

Applications in the chemical industry and laboratories are of a great variety it is stated.

We have been requested by the importer of this calculator, Mr. Kenneth Miles, 13 Netherhall Gardens, London N.W.3, to state that the price is £25, and that a demonstration is considered necessary.



Unical decimal desk calculator

Commercial News

- **Acceptance of Aspro Bid Recommended**
- **B.O. Group's £1 Million Overseas Expansion**
- **Hüls Turnover 10% Up Over Year**
- **Bayer to Raise Capital by £11 Million**

Aspro-Nicholas

The share exchange and cash offer by Aspro-Nicholas for the ordinary capital of Griffiths Hughes Proprietaries, with the alternative cash purchase offer by S. G. Warburg and Co. have now been sent to holders.

Griffiths Hughes directors have recommended acceptance of one or the other; they are accepting the Aspro offer in respect of their own holdings of £5,200. Aspro directors own or control £142,400 of Griffiths Hughes ordinary shares.

Recommending the offers, Griffiths Hughes directors say that their policy of development and diversification followed in recent years is now beginning to bear fruit, and sales and profits for the year ending 31 March 1960, will show a considerable increase. Progress made in the current year is likely to continue, they add that, as a result of the merger, the combined undertaking should be in a stronger position and capable of earning higher profits than would the two groups had they continued as separate entities.

If the offer becomes unconditional, Mr. M. A. Nicholas, chairman of Aspro and Mr. I. W. Jamison will be appointed directors of Griffiths Hughes and Mr. O. Peter Marland and Mr. R. E. Huffam will be invited to join the board of Aspro. Mr. C. B. Green will remain chairman of Griffiths Hughes.

Benn Brothers

Directors of Benn Brothers Ltd., publishers of CHEMICAL AGE, recommend payment of a 3% dividend on preference shares for the half year ended 31 December (same), and a 5% interim on ordinary (same); both less tax.

British Benzol

Given a continuance of the present level of industrial activity, chairman of British Benzol and Coal Distillation Ltd., Mr. Geoffrey Edwards, considers that it would not be unreasonable to expect the future of the company to be very bright.

In the latter part of the year under review (1958-1959) a healthy improvement in the affairs of the company is noted. Plant is now working to capacity.

British Oxygen

Group profits of the British Oxygen Co. Ltd. for the year ended 30 September were £12,926,867 (£11,319,153). Tax took £4,065,754 (£3,890,438) and net profit stood at £4,521,390 (£3,334,062). £1 million of the £1.6, increase in pre-tax profits is reported to be due to expansion abroad, and the bulk of the rest to the Engineering Division's operations. Spending on capital investment for the period 1958 to 1961 is at the rate of £24 million.

Chemische Werke Hüls AG

Turnover of Chemische Werke Hüls AG in 1959, already estimated at DM600 million (over £50 million), was DM606 million. This sum was 10% higher than in the previous year. Exports continued to account for 34% of all sales, and 70% of all exports went to other European countries, including the U.K. In the 20 years of its existence, the company has invested about DM1,000 million (about £84 million) and raised the number of its products from 39 to 540. In 1959 new low-pressure polythene and phthalic anhydride installations were brought on stream.

In the case of the associated company, Bunawerke Hüls GmbH, Marl, production increased from 1,500 tonnes a month of synthetic rubber in January last to 5,500 tonnes in December last; of the 41,400 tonnes of synthetic rubber sold by the company in 1959, 9% was exported. Some 20% more butadiene and 48% more processed rubber could be produced over the year than had been at first planned for. With the introduction of new plant, synthetic latex polymerisation capacity has now reached 90,000 tonnes per year.

Farbenfabriken Bayer AG

Farbenfabriken Bayer AG, are to become the company with the highest share capital in Germany, following a decision to raise capital from DM.660 million (some £55 million) to DM.735 million (about £61.25 million).

For the financial year 1959, Bayer intend to pay a dividend rather higher than that of 14% declared for the 1958 financial period. During 1959, Bayer turnover rose by some 22.1% over the previous year to DM.2,460 million (about £205 million). Share of exports in turnover is given as 43% (42%). In the current financial year Bayer's annual turnover is hoped to rise further, to some DM.3,000 million (some £250 million). In the 1959 turnover, chemicals had a share of 44% (same), pharmaceuticals 9% (same), plant protection media 7% (same), dyestuffs and fibres 25% (24%) and photographic chemicals 15% (16%). The company invested DM.250 million in 1959 and expects to spend some DM.300 million in 1960.

Apart from the expansion of installations necessitated by these extensions in production, the company's chlorine electrolysis plant in Uerdingen is to be rebuilt and chlorine production doubled to a future annual figure of 60,000 tonnes.

Research expenditure for 1959 is given as DM.110 million, an increase of DM.10.3 million.

Chemstrand Corporation

Sales of the U.S. Chemstrand Corporation for 1959 were a record; consolidated sales for Acrilan and nylon totalling $197.3 million ($172.9 in 1958). Consolidated net income in 1959 was £24 million ($18.3 million).

Market Reports

STEADY CALL AGAINST EXISTING CONTRACTS

LONDON New home business on the industrial chemicals market continues satisfactory, with buyers looking beyond immediate requirements. There has also been a steady call against existing contracts.

During the past month price reductions have been announced for industrial alcohol, certain plasticisers, and a number of other products, while quotations for the non-ferrous metal compounds have been subject to the fluctuations in metal prices. However, the price position generally remains very steady.

Demand for fertilisers is again only moderate. There has been no outstanding feature on the coal tar products market, but most items are reported to be in steady request.

MANCHESTER Traders on the Manchester chemical market during the past week have reported a steady contract movement of the soda and potash compounds and other leading heavy chemicals to home industrial users, including the textile bleaching, dyeing and finishing trades. The shipping demand continues on a satisfactory scale and covers a wide range of products. A fair number of both home and export inquiries are in circulation. Prices generally are fully maintained. There is a gradual seasonal improvement in the call for fertilisers, with a steady business passing in most sections of the by-products market.

SCOTLAND From most sections of the Scottish market business has been steady during the past week. Demands have again been varied and covered a range of industrial chemicals. Quantities against contract requirements have also been well maintained. Interest, too, has been shown in the volume of inquiries received. Prices generally have remained firm.

Overseas News

SHELL'S N.S.W. REFINERY EXTENSION WILL SUPPLEMENT PETROCHEMICAL FEEDSTOCK

A NEW £17 million catalytic cracking plant, primarily for the production of motor spirit, is to be erected at Shell's Clyde Refinery in Australia. On completion this new unit will be the biggest of its kind in the country and one of the biggest in the world.

Significance of the plant to Australia and New South Wales will be threefold. It will have a capacity of 150 million gallons of motor spirit yearly. When it comes on stream Clyde's total motor spirit output will be increased to more than 250 million gallons yearly—equivalent to a quarter of the total Australian consumption of the product.

Greater flexibility to Shell's refining operations in Australia will be provided by the new plant, which will enable a wider variety of feedstock from different parts of the world to be used.

The new unit will also provide a supplementary feedstock for the new £A10 million ethylene manufacturing and purification unit, jointly announced by Shell Chemical-ICIANZ (Imperial Chemical Industries of Australia and New Zealand Ltd.), thus helping the development of a petroleum chemicals industry in N.S.W.

Work on the plant is expected to begin early this year, and it will take three years to complete.

Hooker Plan $10 m. Expansion of Chlor-Alkali Capacity

To increase production capacity of caustic soda, caustic potash and chlorine at their Niagara Falls, N.Y., plant, Hooker Chemical Corporation plan to invest about $10 million in a new installation of Hoechst-Uhde mercury-type electrolytic cells during 1960-1961. The cell installation should be completed by the late spring of 1961.

This chlor-alkali installation marks the first phase of a four-step electrolytic cell expansion programme at Niagara over the next few years. The next two steps call for supplementary Hooker-type diaphragm cells, the fourth being another mercury cell addition. Mercury cells were selected for the initial phase, so as to produce caustic soda and caustic potash of extremely low salt content, preferred for some uses.

Hoechst-Uhde cells were chosen because the latest and largest model, rated at 120,000 amp., provides an unusually high current rating, making possible greater output for a given capital expenditure and effecting considerable economy of floor space. Secondly, adjustment of the graphite anodes can be made easily and precisely by means of small micrometer screws compared with more cumbersome methods for other cells. The new cells will be mounted on two floors—one bank on top of another—effecting savings in copper bus bar leads from power rectifiers to the units. They are 54½-ft. long, 4-ft. wide, rest on porcelain insulators, and rise to about 3½-ft. from floor level.

Badger to Build Dutch Latex Plant for Dow

A styrene-butadiene latex plant is to be built in Rotterdam by Dow Chemical International's wholly-owned Dutch subsidiary, Nederlandsche Dow Maatschappij N.V., at the site of the present terminal and warehousing facilities. Investments in the new installation total over Guilders 7.5 million. Completion of the plant is scheduled for early spring 1961, and initial annual capacity is expected to be large enough to cover the increasing styrene-butadiene latex requirements of West Europe.

Badger N.V., with offices at The Hague, have been awarded the contract to build the facility.

U.S. Carbon Black Companies in New European Agreement

In order better to serve the growing tyre and rubber industry in the Common Market area and in the Outer Seven, the Columbian Carbon Co. and the Continental Carbon Co., both of the U.S., have made arrangements to co-ordinate manufacturing facilities of their two major plants in the European area.

Lyle Shepard, president of Columbian Carbon and H. R. Wall, president of Continental Carbon announce that Columbian Carbon have purchased an interest in Continental's new 25-million lb. carbon black plant in Rotterdam, Holland, which will be operated as Continental-Columbian Carbon (Nederland) N.V. This plant will be in production in mid-Spring of this year.

At the same time, Continental Carbon have purchased an interest in the new 60-million lb. carbon black plant being built by Columbian Carbon at Trecate, near Milan, Italy. This plant will be operated as Columbian Continental Europa S.p.A. It will be completed in the late autumn of 1960.

International marketing of the production of both plants will be handled by Columbian Carbon International, Milan, for Columbian Carbon and Witco Chemical Co. Ltd., London, for Continental Carbon.

French Chemical Firms in Two Metals Ventures

Following their recent chemical sales pooling agreement with St. Gobain, Péchiney have now formed a new subsidiary with Penarroya, a French non-ferrous metals concern. The new company, Afcodur, will manufacture, process and sell plastics materials, particularly sections, tubes and sheets. Each parent company will hold half of the F50 million capital.

Kuhlmann, also French chemicals producers, have now with the Soc. Metallurgique D'Imphy formed a new subsidiary, D'Imphy-Kuhlmann, to undertake melting and transformation operations with pure metals and kindred alloys, and the sale of finished products.

Shareholders of the two French chemical concerns Et. Kuhlmann and Soc. des Produits Chimiques Coignet, have approved in principle a merger between the two companies, under which shareholders of Coignet would receive two Kuhlmann shares of a nominal value of 50 new francs for each five Coignet shares of a nominal value of 30 new francs.

Cellulose from Israeli Eucalyptus

Plans are said to be under way in Israel for establishment of 'an entirely new enterprise for the manufacture of cellulose from Israel eucalyptus', main impetus for which comes from the needs of the State for new materials to serve industrial development. Two Israel scientists have been honoured by the University of Geneva for work in connection with the above scheme. (See People, p. 211.)

Plans for European Chemical Trade Federation

Recently, the council of the Bureau de Liaison des Associations et Syndicats Europeens du Commerce de Gros des Produits Chimiques met at Hamburg to compile an agenda for a congress on European trade in chemicals that will take place at Ostend on 8, 9 and 15 June. Countries represented at the council meeting were Belgium, France, Italy and West Germany. The Ostend congress will discuss proposals for setting up a European Chemical Trade Federation.

Belgian Company Trebles Output of Lithopone

S.A. Produits Chimiques de Nieuport have now completed the modernisation and enlargement of their lithopone plant. Capacity for the production of red seal 30% ZnS lithopone has been trebled. Samples and quotations may be obtained from their U.K. agents, Guest Industrials Ltd., 81 Gracechurch Street, London E.C.3 (MANsion House 5631).

Olin Mathieson Ethylene Oxide Plant on Stream in 1960

Olin Mathieson Chemical Corporation's new ethylene oxide plant at their Doe Run works, Brandenburg, Kentucky, is scheduled to go on stream late in 1960. Engineered and constructed by the Lummus Co., New York, the plant will use Shell Development's process for the direct oxidation of ethylene to ethylene oxide. The ethylene oxide product will be converted into derivatives for use in the manufacture of antifreeze, industrial coolants, hydraulic brake fluids, detergents and chemical intermediates.

Feed for the new plant will come

from Olin Mathieson's ethylene plant, also located at Doe Run. The new plant is part of a recently announced $30 million expansion programme for Olin Mathieson's Chemicals Division.

East Germany to Raise H_2SO_4 Output by 189%

East German authorities state that by 1965, output of sulphuric acid is to be 189% higher than in 1958, that of nitrogenous fertilisers 121%, that of phosphate fertilisers 208%, that of calcium carbide 142%, that of synthetic rubber 125%, and that of synthetic fibres 581%. Annual outputs of these in 1958, 1961 and 1965, respectively, are: sulphuric acid, 531,000 (712,000; 1,005,000) tonnes; nitrogenous fertilisers, 320,000 (392,000; 386,000) tonnes; phosphate fertilisers, 136,000 (193,000; 294,000) tonnes; calcium carbide, 831,000 (1,013,000; 1,180) tonnes; synthetic rubber, 84,000 (91,000; 105,000) tonnes.

Winthrop's Dutch Subsidiary

Under the name Winthrop N.V., a Dutch subsidiary has been established in Haarlem by Winthrop Products Ltd. of Kingston-upon-Thames, the export organisation of Bayer Products. Winthrop Products and Bayer Products are themselves subsidiaries of Stirling Drugs Inc., of New York.

The new Dutch subsidiary will import six Winthrop drugs from Britain in bulk and may add others to its range later.

Nominal capital of Winthrop N.V. is Fl200,000 (£18,000) and is entirely held by Winthrop Products Ltd. Winthrop subsidiaries have been set up or are being formed in seven other Continental countries—Finland, Sweden, West Germany, Belgium, France, Switzerland and Austria.

Montecatini in Holland

It is reported that Montecatini of Italy are negotiating the purchase of a site at Axel (Zeeland) in The Netherlands where it is intended to build a large chemical plant.

Turkey's Sulphur Output

Turkey's sulphur production last year reached an annual level of 13,500 tonnes. For the present year, it is expected that output will increase to some 14,500 tonnes. Stocks total about 6,000 tonnes.

Soviet Scientists Develop New Polysylvans

There are reports of a Soviet advance in high-molecular compound chemistry from the Uzbek Academy of Sciences in Tashkent. Mr. Abdulla Sultanov, assistant director of the Polymer Chemistry Institute—which is attached to Academy of Sciences—is reported to have obtained a new group of high-molecular compounds, called polysylvans.

They are to be extensively used in electrical engineering as glues and solvents and for cable coating. One of the polysylvans is to replace three basic materials used in making lacquer coatings; the coatings, it is claimed, will be much cheaper as a result. Another of the polysylvans is said to increase the heat resistance of lacquers from 250° to 450°C.

£10 Million Nitrogen Extensions for Modderfontein

Soon to be completed at the site of the Modderfontein Dynamite Factory is a £1 million Lurgi plant. It will convert non-coking coal into semi-coke, and will be the first of the six main units of the £10 million-nitrogen extensions to be brought to the production stage.

When in full operation, the extensions will enable Modderfontein to produce 110,000 tons of urea a year, making South African agriculture self-sufficient as far as nitrogen is concerned.

The Lurgi plant consists of two units capable of handling a total of 880 tons of coal a day to produce 650 tons a day of semi-coke. As the Union's reserves of coking coal are limited, African Explosives and Chemical Industries have decided to base the operation of the enlarged ammonia plant on low-grade, non-coking Transvaal coal. The coal will be carbonised in the Lurgi plant to a semi-coke which will subsequently be gasified with oxygen and steam to yield water gas. This gas, after purification and mixing with nitrogen, will be used for ammonia syntheses.

By-product of the purification process is carbon dioxide which when reacted with ammonia under pressure, yields urea.

New Zealand D.S.I.R.'s Process for Hydrochloric Acid

Hydrochloric acid production will be cheaper using a process evolved by the Department of Scientific and Industrial Research, a New Zealand report indicates. The method involves the passing of common salt solution through an ion-exchange resin. Hydrochloric acid is given off as an effluent. When the resin is exhausted, it can be regenerated with sulphuric acid, the report states.

New Nitrogen Plant for Denmark Planned

Aktieselkabet Ammonia (Ammonia Ltd.) have announced plans for the establishment of an 80 million kroner nitrogen unit in Grenaa, Jutland, to cover one-third of Denmark's consumption of fertilisers. The company states that investigations are at present being made into the economic aspects of the project and, if the plans are then considered economically sound, the new plant is expected to be put into operation in 1962.

Urea Plants Planned for in Bulgaria

A urea plant with an annual production capacity of 10,000 tonnes is to be erected this year at the Stalin chemical combine in Bulgaria. The plant will come into production next year. Urea is also planned to be produced at the Starasagora Nitrogen works, Bulgaria, where annual capacity will be between 20,000 and 25,000 tonnes.

Production of Glass-Nylon Plastics begins in Italy

New plants built by P.V.R. (Plastici Vetro Rinforzati) of Milan at S. Damiano di Brugherio (near Monza) have started production of Filon, which is a plastics material reinforced internally with glass and nylon fibres.

Fully automatic processing of the new material permits very long sheets to be produced, while an electronic system ensures its perfect uniformity. Main use for Filon will be in the building industry.

New Method for Determination of Zirconium Content Developed in Italy

A METHOD for determination of small quantities (a few units per thousand) of zirconium present in quartz-bearing rocks and sands, rich in iron, has been developed by Dr. Maria Lucco Borlera of the Institute of General and Applied Chemistry of the Polytechnicum, Turin.

Most of the iron is eliminated by means of distillation in an atmosphere of chlorine and in presence of graphite, at a temperature of about 350°C. A further distillation at 650°C. gives quantitative separation of zirconium in form of tetrachloride. Estimation of zirconium in the distillate is carried out by means of the amperometric method by precipitating it with cupferron. Interference of the residue trivalent iron is eliminated by reduction with ascorbic acid.

Dr. Borlera has tried her method extensively on specimens of quartz-bearing rocks and especially sands which are frequent in Latium. Such sands are rather rich in magnetite (20% to 30%) and the problem is to find a method that would permit estimation of small quantities of ZrO_2 out of a thousand of others, especially as the content of Fe_2O_3 in such sands is apt to be 250-300 times larger than the content of zirconium.

In this kind of analysis titanium which is often present in rocks and sands is also likely to interfere. In the specimens studied by Dr. Borlera, titanium (TiO_2) content ranged from 1.5% to 3.2%. Both iron (III) and titanium yield a precipitate in an acid (sulphurous) medium with cupferron.

Practical experiments have demonstrated that Dr. Borlera's method permits tracing very small quantities of zirconium in siliceous rocks and sands, even if rich in iron.

If the amount of zirconium present is very small (i.e. 1 part per thousand) it is advised that the sample be subjected to a preliminary treatment with hydrofluoric acid, which treatment eliminates a large part of the silica present in the sample.

PEOPLE in the news

● **Dr. Menaham Levin,** director of the Fibre and Forest Products Research Institute, of the Israel Ministry of Commerce, and his colleague **Mr. Abraham Lengil,** an engineer, have been awarded 10,000 Swiss francs Habif Prize by the University of Geneva for their researches into the extraction of cellulose from various substances. (See page 209.)

● **Lord Netherthorpe,** formerly Sir James Turner, has joined the board of Fisons Ltd. with effect from 1 February. He is retiring president of the National Farmers Union, a position he has held since 1945.

● **Mr. W. G. Oliver** has been appointed a director of Hickson and Welch Ltd., Castleford, Yorks. Other group appointments are those of **Mr. M. N. Salmon** and **Mr. C. D. Cook** as directors of Hickson's Timber Impregnation Co. (G.B.) Ltd., and those of **Mr. A. P. Clarke** and **Mr. E. A. S. Price** as directors of Richardson and Starling Ltd.

● **Mr. P. J. Gilbert,** who was for five years representative of Borax and Chemicals Ltd. in the Midlands, is to be appointed sales manager in succession to **Mr. H. F. Barnet,** who is retiring after 21 years' service. Both the retirement and the new appointment take effect from 31 January. **Mr. B. W. Green** will take over as secretary of the company on the retirement of **Mr. W. C. Steer,** who, like Mr. Barnet, has been with Borax since their inception 21 years ago.

P. J. Gilbert

C. R. Evans

● **Mr. C. R. Evans** has joined Servomex Controls Ltd., Crowborough, Sussex, as manager of the Chemical Instruments Division. Mr. Evans was with I.C.I.'s General Chemicals Division as works instrument manager from 1949 to 1956, when he joined the I.C.I. central instruments laboratory. His work with the company covered chemical plant instrumentation, automatic control, analogue computors and evaluation of proprietary chemical plant instruments. He is at present supervising several new development projects in the field of chemical instrumentation, as well as the magnetic oxygen analyser being made by Servomex under licence from the Distillers Company Ltd.

● **Mr. Sidney Tindale** has been appointed general manager, marketing, of the National Benzole Co. Ltd., with responsibility for the company's sales and physical operations.

● **Mr. F. W. Tomlinson,** managing director of Pyrotenax Ltd., **Mr. J. M. Willey,** director and general manager of Murex Welding Processes Ltd., and **Mr. P. S. Bryant,** of Murex Ltd., have been appointed to the board of Murex Ltd. Mr. Tomlinson also joins the board of Murex Welding Processes.

● **Mr. J. B. Laurie, B.Sc.(Eng.), M.I.E.E.,** has taken up the new appointment of general manager (commercial) at the production group headquarters, Risley, U.K.A.E.A. He will be particularly concerned with negotiation of contracts for the sale of uranium fuel elements for home and overseas reactors and associated 'know-how' agreements.

● **Mr. H. M. Kimberley** is to succeed **Mr. F. W. A. Paterson** as manager, administration, at the Carrington works of the Shell Chemical Co. as from 1 April.

● **Dr. A. P. C. Cummings** has joined the John Bull Rubber Co. Ltd., as technical director. For the past three years he was with Laporte Industries Ltd., at Luton, as a director of chemical engineering.

● **Mr. W. E. H. Metcalfe** has, following medical advice and on the near approach of his 65th birthday, retired from the board of Ilford Ltd. **Mr. F. O'S. W. Hutchinson,** secretary of the company, and **Mr. G. A. Jones, M.A.,** production manager, have been appointed directors from 21 January.

● **Mr. W. D. Scott,** who has resigned from his posts as chairman and director of Scottish Agricultural Industries Ltd. because of a change in his work as director of I.C.I.'s fertiliser and agricultural interests, is succeeded by **Mr. R. A. Banks.** In 1924 Mr. Banks joined Brunner Mond and Co., one of the four principal companies which merged in 1926 to form I.C.I. His knowledge of agriculture and fertilisers is a good deal more than technical, since he is a farmer with several hundred acres and is particularly interested in forestry.

● Sailing for New York on the *Queen Mary* this week was **Mr. Ambrose Congreve,** chairman of Humphreys and Glasgow Ltd., on a six-weeks tour of the U.S. and Canada.

● **Mr. H. Cawley** has been appointed Sheffield area sales manager for Union Carbide Ltd., with an office at Grange Mill Lane, Wincobank, Sheffield.

DIARY DATES

MONDAY 1 FEBRUARY

C.S.—Manchester: College of Science and Technology, 6.30 p.m. 'Structure and reactions of the gallium halides', by Dr. N. N. Greenwood.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. 'Industrial separation of isotopes', by K. D. B. Johnson.

Soc. Instrument Tech.—Sheffield: University, St. George's Sq., 7 p.m. 'Feedback—the principle of control', by R. S. Medlock.

TUESDAY 2 FEBRUARY

C.S., R.I.C. and S.C.I.—Edinburgh: Biochemistry Lecture Theatre, University, Teviot Pl., 7.30 p.m. 'Reaction mechanisms', by Prof. E. D. Hughes.

C.S.—Nottingham: Chemistry Dept., University, 5 p.m. 'Behaviour of ionic solutions in hydrogen peroxide', by Prof. W. F. K. Wynne-Jones.

C.S.—Sheffield: Chemistry Dept., The University, 8 p.m. 'Ionic crystals and their melts', by Prof. A. R. J. P. Ubbelohde.

Inst. Plant Eng.—Edinburgh: 25 Charlotte Sq., 7 p.m. 'Leith Fertiliser Works', by G. B. White.

Textiles Inst.—Manchester: 10 Blackfriars St., 7 p.m. 'Processing aids and textile finishes', by J. Earnshaw.

WEDNESDAY 3 FEBRUARY

C.S.—Dublin: Chemistry Dept., University College, 5.30 p.m. 'Some aspects of chemistry of quaternary ammonium compounds', by Dr. J. Mckenna.

I.Chem.E.—Birmingham: Midland Hotel, 6.30 p.m. 'Exchange of deuterium between hydrogen and liquid ammonia', by P. J. Bourke and J. C. Lee.

R.I.C.—Walthamstow: South-West College of Technology, Forest Rd., E.17. Film show.

R.S.A.—London: John Adam St., Adelphi, W.C.2, 2.30 p.m. Sir William Pope Memorial Lecture: 'Modern dyes', by C. Paine.

S.C.I. with S.A.C.—London: Chem. Soc., Burlington Hse., W.1, 7 p.m. 'Spectroscopic investigations of fats', by Dr. D. Chapman.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. 'Preparation and uses of nitriles', by D. J. Hadley.

THURSDAY 4 FEBRUARY

C.S.—Bristol: Chemistry Dept., University, 5.15 p.m. 'Chemisorption on platinum', by Prof. J. G. Aston.

C.S.—Hull: Organic Lecture Theatre, Chemistry Dept., University, 5 p.m. 'Atomic reactions', by Dr. J. W. Linnett.

Plastics Inst. and Inst. Rubber Ind.—Southampton: Chemistry Dept., University, 7.30 p.m. 'Plastics and rubbers under extreme operating conditions', by E. W. Russell.

Polarographic Soc.—London: 'Duke of York', 8 Dering St., W.1, 7.30 p.m. 'Some polarographic problems in semiconductor analysis', by Dr. V. J. Jennings.

R.I.C.—Kingston: Technical College, Fassett Rd., 6.30 p.m. 'Water repellent surfaces', by Prof. N. K. Adam.

R.S.—London: Burlington Hse., W.1, 4.30 p.m. Ordinary meeting.

S.C.I. with C.S. and R.I.C.—Belfast: Chemistry Lecture Theatre, Queen's University, 7.15 p.m. 'Titanium and its alloys for chemical plant and allied equipment', by B. J. Connolly.

FRIDAY 5 FEBRUARY

C.S.—Birmingham: Large Chemistry Lecture Theatre, University, 4.30 p.m. 'Big rings', by Prof. R. A. Raphael.

C.S.—Cambridge: Univ. Chemical Laboratory, Lensfield Rd., 8.30 p.m. 'Some antibiotics derived from actinomycetes', by Prof. A. W. Johnson.

C.S.—Exeter: Washington Singer Labs., Prince of Wales Rd., 5 p.m. 'X-ray analysis of molecular structure', by Mrs. D. M. Crowfoot-Hodgkin.

S.C.I.—Glasgow: Royal College of Science, 7.15 p.m. Jubilee Memorial Lecture: 'Recent developments in chemistry of carbohydrates', by Prof. W. G. Overend.

S.C.I.—Manchester: Large Chemistry Theatre, University, 6.30 p.m. Levinstein Memorial Lecture: 'Future of chemicals from petroleum', by L. H. Williams.

S.C.I. and R.I.C.—Middlesbrough: Constantine Technical College, 8 p.m. 'Delrin: a new acetal resin', by Dr. G. F. C. Barrett.

Soc. Instrument Tech.—Fawley: Admin. Bldg., Esso Refinery, 5.30 p.m. 'Why control processes automatically?' by Prof. R. H. MacMillan.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £31.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. Mono-and di-, ton lots, d/d, £106 and £97 10s.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s d/d to 5s 5½d; golden, 3s 3½d d/d per lb. to 4s 8½d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 5-ton lots or more, bag packing, £37 10s

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2¾d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid. In kegs, 1-4 cwt. lots, per cwt. £9 18s 6d; 5 cwt. lots, up per cwt., £9 15s; packed in paper bags, 5 cwt. lots, up, per cwt., £9 8s 6d.; 1-4 cwt. lots, per cwt., £9 13s 6d.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 2s 1d.

Copper Sulphate. £80 15s. per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £119 0s 0d; 35% wt., d/d, £143.

Iodine. Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodoform. Under 1 cwt., per lb., £1 2s 4d for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

Lactic Acid. Pale tech., 44% by wt., per lb., 14d; dark tech., 44% by wt., per lb., 9d; chem. quality, 44% by wt., per lb., 12¼d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £108 10s per ton; orange lead, £120 10s per ton; Ground in oil: red, £128 15s, orange, £140 15s.

Lead, White. Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £120; Ground in oil, £139.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £110 10s per ton.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, £1 1s; 5-cwt. lots, in 28-lb. parcels, £1 1s 3d; 1-cwt. lots, £1 1s 6d.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 5-cwt. casks, c.p., about £133.

Phosphoric Acid. Tech. (s.g. 1.700) ton lots, c.p., £100; BP (s.g. 1.750), ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2¼d.

Potassium Iodide. BP, under 1-cwt., per lb., 7s; per lb. for 1-cwt. lots, 6s 10d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11¾d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £80 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £133.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £88; tri-sodium, crystalline, £39 10s, anhydrous, £86.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £10-£11 12s 6d; 140° Tw., arsenic free, £8 7s 6d; 140° Tw., arsenious, £8 2s 6d.

Tartaric Acid. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £110, green seal, £108; red seal, £105.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £128; in 10-gal. drums, £118; in 40-45 gal. drums, under 1 ton, £93; 1-5 tons, £90; 5-10 tons, £89; 10 tons and up, £88; in 400-gal. tank wagons, £85.

Butyl Acetate BSS. 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133; 1-5 tons,

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MANCHESTER	Royal London House, 144-146, Deansgate, Manchester, 3. Tel: Deansgate 2411
GLASGOW	48-54, West Nile Street, Glasgow, C.1. Tel: City 3391
BELFAST	16-20, Rosemary Street, Belfast, Northern Ireland. Tel: Belfast 26094
DUBLIN	33-34, Westmoreland Street, Dublin. Republic of Ireland. Tel: Dublin 72114

PG/Sel/2

£130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £203; 45-gal. drums, d/d, 1-4 drums, £209.

Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. drums, d/d, 1-4 drums, £193 10s.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179; 45-gal. drums, d/d, 1-4 drums, £185.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £276; 45-gal. drums, d/d, 1-4 drums, £282.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £132.

Ethyl Alcohol (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 1d. Absolute alcohol (75.2 o.p.), p.p.g. extra, 6d.

Methanol. Pure synthetic, d/d, £43 15s.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. In 5-gal. drums, £183; in 10-gal. drums, £173; in 40/45-gal. drums, under 1 ton, £148; 1-5 tons, £145; 5-10 tons, £144; 10 tons and up, £143; in 400-gal. tank wagons, £140.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 7¼d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7¾d per lb.; ex-store, Manchester, London and Glasgow, 8¼d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 8d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8¼d per lb. Ex-store Manchester, London and Glasgow, 9d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4¾d; 40/50-gal. ret. drums extra, per lb., ¼d. Crude, 60's, per gal., 8s 4d.
MANCHESTER: Crystals, d/d, per lb., 1s 4d-1s 7d; crude, naked, at works, 8s 5d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 2d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 7s 4d. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 16s 6d about.

Toluol. Pure, per gal., 5s 9d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 1d.
MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 6s 3d-6s 5½d.

INTERMEDIATES AND DYES

(Prices Normal)

***m*-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

***o*-Cresol** 30/31°C. D/d, per lb., 1s.

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitroanphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 2d.

Two Chemical Workers Died by 'Misadventure'

A VERDICT of death by misadventure was returned at a Whiston inquest on 12 January on Austin Flynn, aged 35, and George Robinson, aged 41, both process workers at Pure Chemicals Ltd., Stockpit Road, Kirkby Trading Estate, Liverpool, where they died during the early hours of 21 December. Two other men who were found unconscious also gave evidence, and another chemical process worker told how he found the four men in a tea-room at the factory. The door and windows were all shut and a gas grill and an electric fire were burning. Mr. W. Tucknott, a Gas Board fittings supervisor, said the gas grill was in good condition, but the burner could have caused the gas to light back in it.

Dr. W. K. McGinley, pathologist, said the cause of death in both cases was asphyxia due to anoxia, accelerated by carbon monoxide poisoning.

TRADE NOTES

Polyflex Price Reductions

Further price reductions, effective from 25 January, have been made for Polyflex sheet by Monsanto Chemicals Ltd. due to increasing demand which has led to further improvements in production costs. Prices of crystal clear Polyflex 100 in gauges between 0.005 in. and 0.015 in. are reduced by 6d a lb., while the 0.020 in. gauge is reduced by 4d per lb. The new prices apply to the recently introduced vacuum-forming and pressure-forming grades as well as to the standard material. Similar reductions are being made for coloured Polyflex in the same gauges.

Hyperpure Silicon in U.K.

New Metals and Chemicals Ltd., Chancery Lane, London W.C.2, have been appointed sole U.K. distributors of Hyperpure silicon produced by Trancoa Chemical Corporation, manufacturers of semiconductor grade polycrystalline and single crystal material.

Agents for Meister AG

C. Tennant, Sons and Co. Ltd. have been appointed sole U.K. agents for Meister AG, Basle, Switzerland, for the sale in the U.K. of special stabilisers for p.v.c. polymers produced by Norsk Hydro Elektrisk Kvoelstofaktieselskab, Oslo, Norway, and sold under the trade name Norvinyl. The range of stabilisers includes a barium-cadmium-amine-epoxy stabiliser in paste form, said to provide outstanding heat- and light-stability in p.v.c. plastisols.

Tennnants have acted as sales agents for Norsk Hydro polymers in the U.K. for several years.

Bonding of Polythene

Information on the bonding of Rigidex high density polyethylene is given in technical information sheet No. 9, issued by British Resin Products Ltd., Devonshire House, Piccadilly, London W.1. Procedures for hot gas welding and butt welding are described in the new sheet, together with data on the use of pressure sensitive adhesives and polar and hot melt adhesives.

Firth Cleveland in Oslo

Following a recent visit to Norway by Mr. W. H. Dothie, export sales manager of Firth Cleveland Instruments Ltd., A/S Garek of Oslo have been appointed Norwegian representatives for the Gilbarco-Firth Cleveland electronic tank contents gauge. The gauge can be installed in tanks of all types at temperatures up to 425°F.

Platinum Price Raised

Price for refined platinum quoted by Johnson, Mathey and Baker Platinum Division, Engelhard Industries, has been raised to £30 5s an ounce, from £28 10s.

Metalock in Birmingham

Owing to growth in demand for the firm's metal repair processes, Metalock (Britain) Ltd., 638 Grand Buildings, Trafalgar Square, London W.C.2, have opened a new office in Windsor Chambers, Bearwood Road, Smethwick, Birmingham 41.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 9 March

Evaporators. Weir Ltd., G. & J. **829 819, 829 820 & 829 852**

Production of 3-ketotetrahydrofuran. Distillers Co. Ltd. **829 886**

Producing terephthalic acid mono-(β-hydroxy ethyl) ester and its metal salts. Imhausen Werke GmbH. **829 887**

Production of sulphur-free carbon-monoxide containing gas. Texaco Development Corp. **829 844**

Esterification of pyridine carboxylic acids. Abbott Laboratories. **829 889**

Recovering platinum group metal from composites containing same and alumina. Universal Oil Products Co. **829 972**

Distillation columns. Bataafsche Petroleum Maatschappij N.V., De. **829 894**

Alkylation processes. American Oil Co. **829 895**

Catalytic desulphurisation of heavy sulphur-containing hydrocarbon oil fractions. Bataafsche Petroleum Maatschappij N.V., De. **829 851**

4-Hydroxycoumarin derivatives and the preparation thereof. Spofa, Spojene Farmaceuticke Zavody Narodni Podnik. **830 098**

Preparation of nitro derivatives. Du Pont de Nemours & Co., E. I. **829 853**

Ketene dimer sizing composition. Hercules Powder Co. **830 099**

Process and apparatus for vaporisation of nitric acid. Commercial Solvents Corp. **829 857**

Preparation of polyureas. Beiersdorf & Co. AG., P. **830 102**

Process of recovering ammonia from an ammonia-containing gas. Inland Steel Co. **829 859**

Wet-screening apparatus. Stamicarbon N.V. **829 860**

Manufacture of ferric oxide. Columbian Carbon Co. **830 108**

L-Arginine-L-glutamate. General Mills Inc. **830 109**

Emulsifiable wax or oil compositions. Comcolloid Inc. **830 112**

Tantalum alloy. Sierra Metals Corp. **829 733**

Process of preparing biuret from urea. Stamicarbon N.V. **830 114**

Glutamic acid. Du Pont de Nemours & Co., E.I. **829 938 & 829 939**

Acridinyl-10-oxides. Parke Davis & Co. **829 728**

Utilisation of residues from the incineration of refuse. Metallgesellschaft AG. **829 988**

Herbicidal compositions. Amchem Products Inc. **830 060**

Vacuum casting. Stauffer Chemical Co. **830 122**

Piperazine salt and its preparation. Parke Davis & Co. **830 000**

Dyeing of polyester film. Du Pont de Nemours & Co., E. I. **830 064**

Removal of surface-active contaminants from hydrocarbon oils. Esso Research & Engineering Co. **830 128**

Nitrogen-containing Grignard compounds. Merck & Co. Inc. [Divided out of 829 763.] **829 764**

Liquid oxygen system including valves for controlling fluid flow. Bendix Aviation Corp. [Divided out of 829 941.] **829 942**

Open to public inspection 16 March

Fungicidal products. Murphy Chemical Co. Ltd., and Pianka, M. **830 650**

Colouring matters. Imperial Chemical Industries Ltd. **830 403**

Polymerisation process. Distillers Co. Ltd. [Cognate application 24 498.] [Divided out of 801 401.] **830 742**

Fuel for nuclear reactors. U.K. Atomic Energy Authority. **830 378**

Production of carbon. U.K. Atomic Energy Authority. **830 379**

Apparatus for the removal of water, wax, gum and dirt from hydrocarbon liquids. Dorr-Oliver Inc. **830 380**

Polymerisation using gamma radiation. Manufactures Des Glaces et Produits Chimiques de Saint-Gobain, Chauny & Cirey S.A. Des. **830 515**

Method of making diamonds. General Electric Co. **830 743**

Method of making garnet. General Electric Co. **830 560**

Diquarternary compounds. Wellcome Foundation Ltd. **830 519**

Synthetic resin dispersions and the preparation of sheet materials therefrom. Celastic Corp. [Addition to 766 866.] **830 335**

Production of hydroxylamine sulphate solutions. Leuna Werke Ulbricht, W. Veb. **830 419**

Manufacture of terephthalic acid glycol esters suitable for polycondensation. Rottweiler Kunstseidefabrik AG. [Addition to 827 373.] **830 691**

Optical bleaching agents and processes for the preparation thereof. Compagnie Francaise Des Matieres Colorantes. **830 613**

Bacterial treatment of cellulosic materials. Mackeurtan, M. G. **830 347**

Polyacrylonitrile solutions. Courtaulds Ltd. [Additions to 796 294.] **830 750**

Preparation of oxidation dyestuffs on textile fibres. Compagnie Francaise Des Matieres Colorantes. **830 446**

Pest control compositions. Monsanto Chemical Co. **830 657**

Copolymers of alkenylated urea-aldehyde resins and ethylenically unsaturated compounds. British Industrial Plastics Ltd. **830 751**

Recovering tantalum and niobium from oxidic mixtures containing impurities. Gesellschaft für Elektrometallurgie, and Starck AG, H. C. **830 659**

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IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY. Applications are invited for the post of LECTURER in the Department of Metallurgy. Applicants, who should have a degree in Chemical Engineering or Metallurgy, will be required to teach the engineering principles of Extraction Metallurgy, particular attention being given to the effects of heat and mass transfer and fluid flow on the design and operation of metallurgical processes. Salary, depending on qualifications and experience, in the scale £900×£50 to £1,350 (bar), ×£75 to £1,650 per annum, plus £60 per annum London Allowance and F.S.S.U. membership. Family Allowances if applicable. Applications, with full curriculum vitae, to **Professor F. D. Richardson, Department of Metallurgy, Imperial College of Science and Technology, Prince Consort Road, London, S.W.7.**

PATENTS & TRADE MARKS

The Proprietors of British Patent No. 733,418 for "AN IMPROVED METHOD OF MANUFACTURING CALCIUM CARBONATE OR A CHALK-LIKE MATERIAL", desire to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder. Further particulars may be obtained from Marks & Clerk, 57 & 58 Lincoln's Inn Fields, London, W.C.2.

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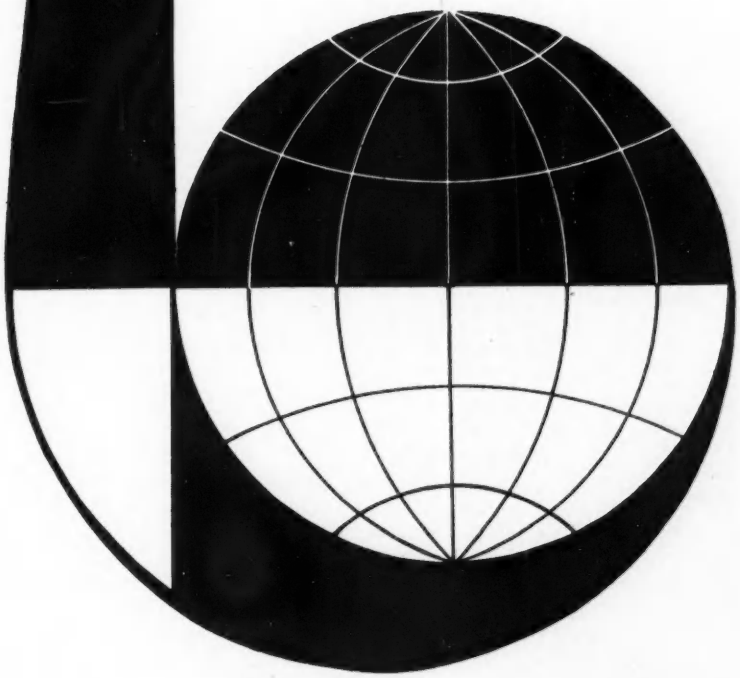

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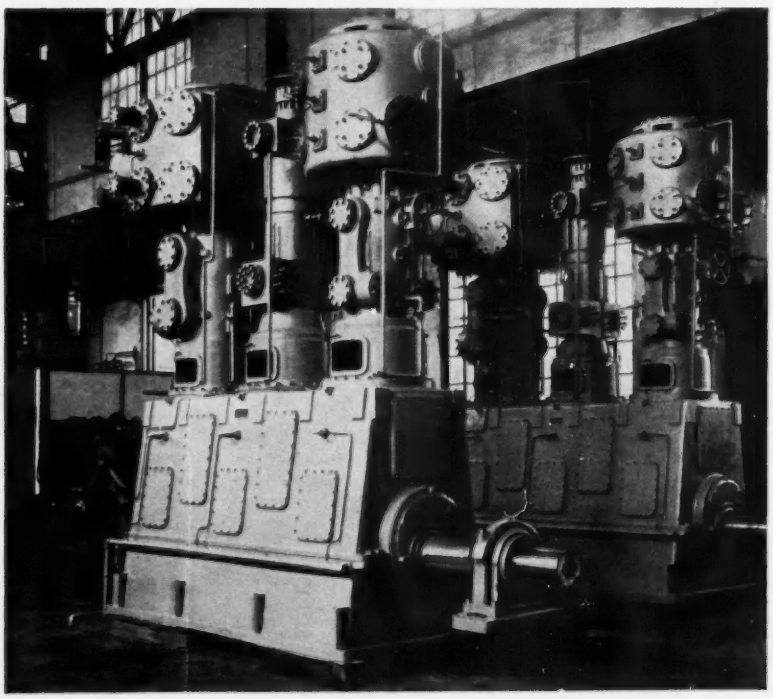

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